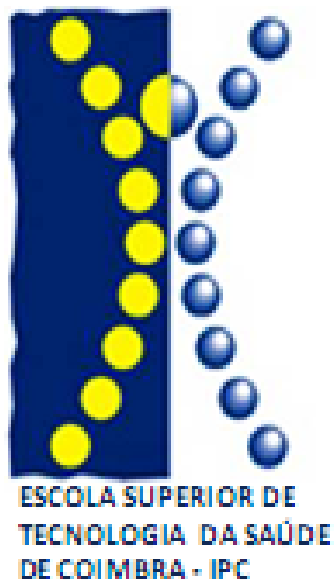


ESTeSC – Coimbra Health School

Poster Week 07/2017

Abstract Book

May 15th – 19th, 2017



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EUTHANASIA: MEDICALLY ASSISTED DEATH

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Euthanasia or medically assisted death is a subject that is being discussed for a while now, however it is still very controversial. This is because the opinions related with ethical, scientific and religious issues are yet divided.

However, this definition isn't yet good enough to find acceptance among the society. It can be defined as a death in which the doctor as an active role, respecting the interests and the requests of the patient and allowing him to die in a more dignified and painless way.

This method mostly used in terminal patients, which are in pain and in irreversible states, having as a goal, the relief of the intense suffer, in the terminal moments of the patients life, granting is right of self-determination. Medicine and technology are in constant evaluation, increasing the ways of keeping the patients alive and with some life quality.

Associated with the euthanasia concept, are others such as dysthanasia and orthothanasia. The first one, is linked with the extension of life, using treatments that are considered "useless" for the person, with the only objective of delaying the day of the death, despite the fact that the person is still suffering and in pain. The second one refers itself to the natural death of a person without any attempt to shorten or extended life and suffer.

Euthanasia can be classified in two types: active or passive. Active is when there is the need to assist the death of the patient with medical intervention. The passive one, consist in letting the patient proceed the normal path of the disease, without any medical intervention or treatment.

Keywords: Euthanasia, Dysthanasia, Orthothanasia, medically assisted death

THE ETHICS ASSOCIATED WITH THE DECISION IN THE PHARMACY PRACTICE - DISPENSE OR NOT DISPENSE THE EMERGENCY ORAL CONTRACEPTION

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Professional practice in community pharmacy has evolved towards increasing the provision of increasingly user-centered services, information and health care. These activities are developed according to norms and established rules, which aim to direct the conduct of the pharmacy professional. Decision-making during dispensation is based on a set of bioethical principles governing the behavior of professionals: beneficence, non-maleficence, autonomy and justice. In this context professionals often face ethical dilemmas to make a decision where they will have to make a professional judgment to act in the most appropriate way. In this context, the Emergency Oral Contraception (EOC) waiver is clearly a situation where dialogue with women (or couples) seeking counseling puts professional judgment to the test. Thus, it is necessary that the service takes place in a privacy environment, using an intervention methodology: evaluation of the user, analysis of inclusion and exclusion criteria, informing, advising and follow-up of the user. The objective of this study is to analyze how the religious beliefs of pharmacy professionals influence the decision process in the practice of exempting EOC in community pharmacy. The results show that the dismissal of EOC is influenced by the intraspecific variability of each professional. Thus, is a need to inform and train professionals so that prejudices are cleared up and clarify misunderstandings, aspects that can influence the dispensation act. That is why professionals need to be competent, creative and contextual, and understand that professional ethics must be reflected in daily action, activities and daily tasks for the benefit of patients.

Keywords: Ethical; Religious; Dispensation; EOC

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ETHICAL DILEMMA OF PHARMACY PROFESSIONALS WITH DIETARY SUPPLEMENTS AND NATURAL PRODUCTS ADVISING

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Background: The purpose of pharmacy professionals is to dismiss medicines, natural products, medical devices and provide the best information and advice to the patients. In recent years there has been an increase in demand for dietary supplements and natural products. In that way, these professionals need to have the necessary knowledge to inform people about possible adverse effects and food / drug interactions. Therefore, they are faced daily with ethical issues that are based on the lack of information on the safety and efficacy that exists for this type of products.

Objective: The study aims to approach the ethical dilemma that pharmacy professionals deals daily in their practice, namely in dismiss and counseling the dietary supplements and natural products.

Material and Methods: For this study, we used the Pubmed database where research was carried out on relevant publications in relation to the provision of dietary supplements and natural products, highlighting the ethical dilemma. The search was performed with the following keywords: Ethics; Pharmacists; Dietary Supplements.

Results: In his search for dietary supplements and natural products the consumer has a preference for counseling by pharmacy professionals. However, studies show that these professionals have little confidence in the counseling of this type of products.

Conclusion: The main ethical dilemma is the limitation of scientific evidence for efficacy and safety of dietary supplements and natural products. Pharmacy professionals are mainly based on their basic knowledge about the composition of these products, and it is necessary to invest in their continuous formation, in order to they can provide the right information and ensure their proper use.

Keywords: Ethics; Pharmacy Professionals; Dietary Supplements and Natural Products

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MEDICALLY ASSISTED FERTILIZATION | EXCESSIVE EMBRYOS***Ana Rodrigues, Andreia Leite, Sara Abrantes, Sónia Lopes****Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Farmácia, Portugal*

The development of techniques of reproduction medically assisted, especially in vitro fertilization, and the consequent production, handling, freezing and experimentation with embryos, points to a very important question that is based on the ethical, legal and ontological status of human life from its beginning and development. In this way, two areas of extreme importance are highlighted: biology (related to the genesis and development of the human being) and philosophy (Related to the ethical-ontological status of life).

This work isn't only to identify the medically assisted fertilization techniques accepted in the European community, but also to reflect on the ethical issues that arise and the limits that must be set for science in the creation and development of a new human being.

Therefore, a review of the literature with research in online databases was done, and also considering the legislation in force on this subject.

The point of greatest controversy, ontological nature or of ethical-legal, is the status of the embryo and the time from which is considered to be human being. The main positions adopted are based on the one hand in the assignment of the person of the moment of fertilization, the other prospect defines as a milestone for the status of person the appearance of primitive line, which occurs around the 14th day of Fertilization.

The use of techniques of medically assisted is an emerging question, given the fragility that the fetus presents and the fact that the birth of a new individual be a subject with great implication for a society.

Keywords: Reproduction medically assisted; Ethical-ontological, Human Embryo development

THE CONFLICT BETWEEN ETHICS AND BUSINESS IN COMMUNITY PHARMACY

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Introduction: When looking for a pharmacy, it is advisable to have an adequate advice from the health professional, as such, its main goal is to promote the adherence to the therapeutics and the prevention of medication errors. Therefore, the provision of quality pharmaceutical care must be guaranteed by the professional, who demonstrates the capacity and willingness to ensure the rational and safe use of the medication, always complying with certain ethical standards that exceed the minimum legal requirements.

Objective: To evaluate how, over the years, the economic, social and technological changes experienced, by the population, have caused a paradigm shift in community pharmacy, and the idea that any counseling should be patient-centered, and not product-focused, has gained relevance.

Material and Methods: Analysis of several articles researched using the electronic database - PubMed.

Results and Conclusion: The Community Pharmacy is also a business where possible situations of conflict occur, where the professional is forced to choose between their professional obligations and business objectives. The conflict between ethics and business in community pharmacy may have adverse effects on the adherence to therapy, since, depending on the human option, the discourse of counseling instead of insurance may be reticent in some aspects. It is important to have consciousness that these dilemmas are caused by marketing decisions, often made by professionals who do not work directly in pharmacies.

Keywords: Community pharmacy; ethic; business

VOLUNTARY INTERRUPTION OF PREGNANCY: A CONTROVERSIAL ISSUE***Beatriz Garrote; Liliana Valente; Sylvie Pina; Vanessa Vergas****Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Farmácia, Portugal*

Since the eighteenth-century abortion was used for the voluntary termination of pregnancy (VTP), however, despite the advancement of the mentality, it has not yet been possible to generate a consensus on this issue. VTP is considered multifactorial and has both psychological and social consequences on the parent. The discussion on this topic raises questions such as "Does the embryo have a right to life?" and "When does the human life begin?", which focuses on the definition of "Person" that varies according to a culture and a religion, and defines duties and rights. In this sense, there are two currents: the defenders of the VTP, who claim the principle of ethics of autonomy, that is, a freedom to make choices by the mother, and the opponents, who defend the principle of heteronomy and that the fetuses are beings since fertilization.

Currently, in Portugal, abortion is legal until ten weeks of gestation by request of the woman, regardless the reasons and after ten weeks in specific situations. However, despite moral ethical positions, the dignity of women must be respected regardless the social class.

Keywords: Voluntary Interruption of Pregnancy; Ethic; Legislation

USE OF PLACEBO IN THE DEVELOPMENT OF NEW DRUGS

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Placebos are pharmaceutical preparations devoid of any active principle, including only inert products, although their own appearance, form, color or any other characteristic are identical to the effective therapy, mimicking and reproducing their functioning, their mechanisms of action and its side effects. [1,2,4] There are two distinct perspectives: one of them argues that the "inert" character of the placebo would be equivalent to the absence of treatment, contrasting with an idea that placebo is a form of treatment, having a certain effect, although at a psychological level. In the clinical investigation, placebo is administered by a group of patients, in order to allow an evaluation of a principle on the other side between the effects verified and those observed with the control group with placebo.

In one study with a low-energy diet, it produced significant and more frequent weight loss (8.5% of body weight) for 1 year of treatment. However, both groups had adverse events, except for gastrointestinal events, which were 26% more frequent in the orlistat group, but were generally mild and transient.

For the placebo to be effective, it is essential that the patient believes that it will produce the beneficial effects that he or she wants. And so, according to some studies, the placebo effect is linked to patients' awareness that a potentially effective treatment has been received. [3,5] Its inclusion in clinical research has reduced the dimension of the deontological problem, being in the scope of the application of the codified and regulated regulation. [4]

Keywords: Placebo, patient

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ETHICS ASSOCIATED WITH PHARMACOGENOMICS

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Pharmacogenetics includes the study of genetic and its variation, with the use of technological tools, given the response to pharmacological treatments, while the pharmacogenomics studies variations at the genome level and relates these changes to the therapeutic effects of each individual, as well as the development of new clinical applications in these changes. Over the last few years, there has been an evaluation as medicine as the technological level in the area mentioned above. Advanced technology with personalized medicine, has a main objective to maximize the effectiveness of a drug and minimize the risks associated with it, raises important ethical issues. The application of pharmacogenomics to traditional medicine revealed questions in the regulatory concerns of pharmacogenomics, confidentiality and privacy in the implementation of this medicine, the adequate information to the individual as informed consent, the access to this medicine and, consequently, the responsibility of health professionals in this area so specifies this modern medicine.

With this theme we intend to explore better the ethical limitations, advantages and disadvantages consequent to the application of this personalized therapy, as well as possible solutions to minimize them.

Keywords: Pharmacogenetics, pharmacogenomics, ethical.

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AUDITORY BRAINSTEM IMPLANTS

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Introduction: The auditory brainstem implant is a surgically implanted device in people with sensorineural hearing loss that does not have auditory pathway integrity due to cochlear nerve lesions or pathologies such as type 2 neurofibromatosis that do not allow cochlear implantation. Objective: To understand how auditory brainstem implants work, their clinical applications and the contraindications presented, as well as their results in the hearing of the subjects submitted to this technique of auditory/aural rehabilitation. Methodology: A bibliographic search was performed in several databases, such as "Google Scholar" and "PubMed", using keywords such as "auditory brainstem implant", "hearing loss" and "cochlear nerve lesions", which resulted in several articles, being selected 4, whose relevance was greater for this review. Results: The studies indicate an improvement in auditory thresholds in individuals with total hearing loss who were rehabilitated with auditory brainstem implant; one similarity in the levels of detection and discrimination of sounds compared to those obtained in people with cochlear implants; and with the aid of lip reading an improvement in the auditory perception of sound recognition. Conclusion: The brainstem implantation that can return the auditory perception in cases where there is a cochlear lesion and/or in the auditory pathway to the brainstem (which previously was not possible using the cochlear implant) is an ambitious intervention for the interdisciplinary team, with great challenges for the auditory/aural rehabilitation plan.

Keywords: Auditory brainstem implant, neurofibromatosis type 2, cochlear nerve lesions, hearing loss, aural rehabilitation.

COCHLEAR IMPLANTS IN CHILDREN WITH AUDITORY NEUROPATHY/AUDITORY DYSSYNCHRONY

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Introduction: Auditory neuropathy/auditory dyssynchony or auditory neuropathy spectrum disorder is defined as a loss of synchrony in the nerve conduction of sound stimuli to the brain. The localization of this pathology is not precise, since it may be present in the synapses between the inner hair cells and the VIII cranial pair, only in the VIII cranial pair, or in other structures. Cochlear implantation can be a resource for re(h)abilitation of hearing in children with auditory neuropathy/auditory dyssynchony. Objective: To understand the results obtained in children with auditory neuropathy/auditory dyssynchony with cochlear implant placement. Methodology: A bibliographic search was done in different databases such as "Google Scholar" and "PubMed", using keywords as "auditory neuropathy", "auditory dyssynchony", "cochlear implant" and "children", being chosen articles of the last ten years on the subject. Results: Research suggests that the electrical stimulation performed by the cochlear implant can be able to compensate for nerve dyssynchony and that there is a significant improvement in the ability of hearing and communication, which will be a benefit for these children. Conclusion: Cochlear implantation should be considered in auditory/aural re(h)abilitation plan of children with auditory neuropathy/auditory dyssynchony with poor speech understanding ability with conventional hearing aids to try to improve their hearing, communication and quality of life.

Keywords: Auditory Neuropathy; Auditory dyssynchony, Children; Cochlear implants; Auditory/Aural re(h)abilitation

DIGITAL HEARING AIDS: PRESENT AND FUTURE

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Introduction: Since the first digital hearing aid appeared, these have evolved significantly at various levels, especially in miniaturization and advanced signal processing. It is expected that in the future, new and more promising prototypes models will appear. Objective: To study the technological evolution of digital hearing aids. Methodology: A review of the literature on the subject was carried out based on the research in books and in platforms such as B-On and Google Scholar. Results: Although hearing aids are currently quite sophisticated, it is estimated that in the future they will undergo quite development. According to several authors, associated with the miniaturization of components, it is predicted to arise, in large scale, hearing lenses, biologically rechargeable devices, hearing aids compatible with smartphones, improvement in connectivity between the two ears, improvement in digital signal processing algorithms and creation of more developed software. Conclusion: Currently there is a wide range of hearing aids for those who are attending an aural re(h)abilitation plan. However, in the future, it is predicted that this range will be even broader and innovative, so as to provide to its users, among other aspects, greater hearing benefit, comfort, autonomy and aesthetics.

Keywords: digital hearing aids, technological advances, hearing/aural re(h)abilitation

THE ROLE OF THE AUDIOLOGIST IN THE FOLLOW-UP OF THE CHILD WITH COCHLEAR IMPLANT

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Introduction: Cochlear implantation in children is the most appropriate procedure for severe to profound sensorineural hearing loss, in the absence of functional gain with the use of bilateral hearing aids. The rehabilitation plan in children with cochlear implant (CI) is performed by an interdisciplinary team, of which the Audiologist is part. Aim: Understand the role of the Audiologist in the follow-up of the child with CI. Methodology: Based on a systematic review of the literature, a research was carried out in different databases as B-on, Pubmed and Google Scholar, using the following keywords: cochlear implant, child, audiologist role and sensorineural hearing loss severe to profound. Of the articles found, 13 were selected and analyzed in their entirety for this review. Results: The audiologist has the responsibility of tracing the audiological profile of the child, following the process of rehabilitation before, during and after the cochlear implantation. It is necessary, a continuous high quality accompaniment with adequate audiological stimulation. When the child is implanted, a follow-up is developed by the audiologist, that must be continuous, and where the parents play a fundamental role and where there must be adequate audiological stimulation. This process requires regular monitoring of auditory development and language, in clinical as well as, in everyday context. Conclusion: Cochlear implantation in the child requires an intensive rehabilitation plan, where the audiologist has a relevant role in hearing/communication improvement of the child, providing a higher quality of life.

Keywords: cochlear implant, child, audiologist role, sensorineural hearing loss Severe to profound

AURAL RE(H)ABILITATION IN CHILDREN

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Introduction: The early implementation of auditory re(h)abilitation programs is fundamental to develop the auditory perception and communication capacity of a child with hearing loss. Objective: To understand the process of auditory rehabilitation in a child. Methodologies: A bibliographic review was carried out and different databases were consulted: b-on, academic google and RCAAP, using the descriptors "children", "hearing", "hearing loss", "auditory rehabilitation", "hearing aids", " Cochlear implants ". We have considered scientific articles that were pertinent to this study, in a total of four. Results: The selection of hearing aids is performed according to the degree and type of hearing loss, the Behind-The-Ear (BTE) type being most recommended for its versatility in covering all degrees of hearing loss, also because the child's ear is growing, implying mold adjustment to that growth. The type of hearing aid can be replaced, from adolescence, when the degree of hearing loss allows it. In severe to profound sensorineural hearing loss, in the absence of functional gain using bilateral hearing aids, placement of a cochlear implant may be a solution to be considered, preferably up to 3 years, when the child acquires fundamental linguistic and cognitive skills for its overall development. In the auditory re(h)abilitation plan it is essential to have an interdisciplinary team. Conclusion: The sooner hearing loss is detected, the earlier it will be re(h)abiltated to minimize the impact of deafness/hearing loss on the child.

Keywords: children, hearing loss, auditory re(h)abilitation, interdisciplinary team

SLEEP DISORDERS: TREATMENT WITH NON-BENZODIAZEPINE HYPNOTICS

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Sleep disorders are one of the main problems of the 20th century, putting in question the good physical and mental health of a large part of the population, which lead the pharmaceutical industry to work in this area, with the development of drugs that can help improve the quality of sleep as well as life.

The major classes of drugs used include benzodiazepines, barbiturates, non-benzodiazepine hypnotics, antidepressants and antipsychotics.

Sedatives / hypnotics are the most prescribed drugs worldwide, with the ability to induce and maintain sleep in patients who have difficulty sleeping. Treatment should be started at low effective doses and should not exceed the maximum duration of 4 weeks.

Non-benzodiazepine hypnotics or benzodiazepine analogs are the most recent line of drugs used in the therapy of sleep disorders. The mechanism of action occurs only in the benzodiazepine receptors BZ-1, in the α -1 subunit, achieving through the binding with those receptors, the decrease of anti-convulsive, anxiolytic and muscle relaxant effects that are commonly related to the use of benzodiazepines.

There are three medicines on the market, which are: Zolpidem, Zaleplone and Zolpiclone, the latter being the least used because of lack of selectivity.

The effectiveness of these drugs are: increase of total sleep time, reduction of latency and number of awakenings while the side effects they present are minimal such as the potential for abuse (overdose). These drugs should not be used in case of severe respiratory insufficiency, sleep apnea, severe hepatic impairment and alcohol consumption.

Keywords: Non-benzodiazepine hypnotics, difficulty sleeping, treatment

VITAMIN K

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Vitamin K is a very important element in our body because its main function acts directly with blood clotting. This vitamin can be divided in three types: K1 (phylloquinone), K2 (menaquinone) and K3 (menadione).

Vitamin K in the body has as main functions to act in the process of blood coagulation, activate the osteocalcin and inhibit vascular calcification making difficult the formation of plaques in the arteries.

This vitamin is mainly found in green products such as broccoli, lettuce and cucumber however, can also be found in pears, tomatoes and red fruits.

Vitamin K deficiency is a rare nutritional deficiency in adults, but in children it is very common due to K1 and / or K2 deficiency. The lack of this vitamin is uncommon, however, can lead to problems with blood clotting and increased bleeding. Some of the drugs that fight the absence of this vitamin are, for example, warfarin, kanamycin, cyclocerine and phenytoin.

The mechanism of action of these drugs consists in the controlling the levels of vitamin K and later acting as cofactor of gamma-glutamyl carboxylase. One of the most commonly used drugs is warfarin. Its action consists of anticoagulation acting as antagonist of vitamin K. Inhibits mainly the enzyme epoxy reductase of vitamin K, which prevents the cyclical interconversion of this vitamin. The carboxylation of the glutamate residues in the terminal regions of the vitamin K dependent proteins does not occur - Factors 2, 7, 9, 10 and proteins C, S and Z.

In this work we intend to make known this vitamin, to show its importance, function and mechanism in the organism, as well as the foods in which it is present.

Keywords: Vitamins, Vitamin K, Warfarin, Coagulation

TREATMENT OF ANKYLOSING SPONDYLITIS

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Ankylosing spondylitis (AS) is a chronic, painful and progressive inflammatory rheumatic disease that affects the joints of the spine, especially the lower ones (sacroiliac and lumbar joints). This disease is included in a group of diseases called Spondylarites.

The cause of ankylosing spondylitis is still unknown, it is known that it is not an infectious disease, and therefore it is not also contagious, and there is a genetic facilitating factor, called HLA-B27.

The main symptoms of AS are back pain and difficulty mobilizing, often pain in the gluteal regions or low back pain. In some people, fever, loss of appetite, fatigue, or involvement of other organs such as the lungs and heart may occur, although this rarely occurs.

The diagnosis of AS is based on physical symptoms and observation. To confirm the diagnosis, are made radiographs of the basin and spine to see the changes that have occurred in the sacroiliac and vertebrae. The realization of genetic typing for HLA-B27 research can support the diagnosis if it is positive.

Currently, there is no cure, however, there are several effective medications and rehabilitation techniques that allow you to relieve pain and have a good quality of life. Among the top-line drugs are nonsteroidal anti-inflammatory drugs (NSAIDs). However when it affects other joints beyond the spine, the use of sulfasalazine or methotrexate, usually in association with NSAIDs, may be helpful. In the failure or contraindication of these, there is a need to use biological medications, which are proteins that fight against some substances, such as tumor necrosis. Authorized in Portugal are adalimumab (Humira®), etanercept (Enbrel®) and infliximab (Remicade®) as biological medications. Several clinical trials are underway and it is hoped that new biological drugs will soon appear.

Keywords: Ankylosing spondylitis, HLA-B27, Rheumatic disease, Anti-inflammatory drugs, Biological medications

TETANUS VACCINE

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To prevent and protect the vulnerability of the humans to the vulnerability to the microorganism *Clostridium tetani* responsible for the tetanus disease, was created a vaccine. This vaccine causes immune response with antibody formation through the deliberate inoculation of those microorganisms, leading to a quicker and effective response of the immune system in a subsequent contact with the disease, inducing immunity without risk to the vaccine.

This vaccine was included in the National Vaccination Plan in 1966 and is currently associated with other diseases, such as diphtheria, pertussis, poliomyelitis and hepatitis. The Tdpa vaccine contains the tetanus toxoid, diphtheria toxoid and the toxoid antigens and *Bordetella pertussis* subunits. It should be preserved between 2 ° C and 8 ° C without freezing, the administration dose is 0.5 ml and the route of administration is intramuscular. This vaccine is given at 2 months, 4 months, 6, 18 and finally at 5 years old. Then in the PNV there is the Td vaccine containing the tetanus toxoid antigen (T) and the diphtheria toxoid antigen (d), which have the same doses of administration being the first dose of Td administered at 10 years old with reinforcements at 25, 45, 65 years old, and thereafter every 10 years.

Some side effects may occur and should disappear naturally, such as pain at the injection site, redness or local swelling at the injection site, fever, headache, and tiredness.

Keywords: *Clostridium tetani*, Tetanus disease, Tdpa Vaccine

VARENICLINE

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Nowadays, smoking is considered as a severe Public Health problem, being the major cause of avoidable death, incapacity and disease in the world. According to WHO and the European Commission is predicted that tobacco use causes 6 million annual deaths. In Portugal more than 30 persons die due to smoking per day.

Nicotine, which is present in tobacco smoke, can be considered as a psychoactive drug and is the leading factor for the development of the dependency.

The pharmacological treatment boosts the odds of obtaining a long term abstinence and quit smoking with success. In Portugal varenicline is approved to cease adult tobacco addiction. This binds to acetylcholine neural nicotinic receptors $\alpha 4\beta 2$ with great affinity and selectivity, where it behaves as a partial agonist. This drug partially promotes the receptors, without creating a complete nicotinic effect over the release of dopamine, it also blocks the nicotine capacity of activating them, and by so mesolimbic dopamine is not released in the central nervous system. These receptors appear to have a crucial role in reinforcement processes and dependency associated with nicotine, declining the satisfaction and the pleasure correlated to the smoking act. They can have adverse reactions such as: nauseous, headache, insomnia and sleep disorders, fatigue, dizziness, dry mouth and increased appetite.

Varenicline is tested and proven to be effective in aiding smoking cessation near 70% of the cases.

Keywords: Nicotine, Varenicline, Tobacco adiction

PHARMACOTHERAPY OF COPD - BRONCHODILATORS: β 2 ADRENERGIC AND ANTICHOLINERGIC

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Chronic Obstructive Pulmonary Disease (COPD) is characterized by obstruction of the airways resulting from a chronic inflammatory response. Globally, it is estimated that 210 million people have this disease, and in Portugal the prevalence is 14.2% and increases with age and smoking load, affecting mainly males older than 40 years.

The exacerbation of COPD is aggravated by exposure to harmful and aggressive particles, gases and fumes, with the main symptoms being: dyspnea, chronic cough, expectoration and wheezing. However, the spirometry examination is performed in order to obtain a complete diagnosis.

Therapy is used to prevent, control symptoms, reducing the frequency and severity of exacerbations, to increase quality of life. Bronchodilators are the basis of COPD treatment because they decrease airflow limitation, usually by relaxing the bronchial and bronchial muscles. Both β 2 agonist and anticholinergic bronchodilators may be short (SABA and SAMA, respectively) or long-acting (LABA and LAMA, respectively), and β 2 agonists may be further divided into long-acting agonists (12 h) and Action ultra-long agonists (24h). β 2 agonists activate the β 2 adrenergic receptor ($R\beta$ 2A), triggering bronchodilation while anticholinergics inhibit the receptors of the parasympathetic nervous system M1 and M3 and stimulate M2 leading to muscle relaxation and bronchodilation.

However, short-acting bronchodilators may be more or less durable, since for example ipratropium bromide, short-acting inhaled anticholinergic has a longer-lasting bronchodilator effect than short-acting β 2 agonists.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), bronchodilators, β 2 agonist, anticholinergic, β 2 adrenergic

BISPHOSPHONATES IN OSTEOPOROSIS

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Osteoporosis is characterized by a decrease in bone density and quality followed by an increased risk of fracture. This pathology comes up as a result in the remodeling process once bone resorption predominates over a formation instead of being in a balance.

The amount of bone mass is acquired, practically in its entirety, until the age of 20 years. Between the ages of 20 and 30 a boom in terms of bone capital is reached, which declines from 40-45 years continuously in both sexes. However, in the case of the woman, this decrease is accentuated after menopause.

Fracture arises as the first sign or symptom, as a consequence leads to the loss of quality of life of the individual. For this reason, the main goal of pharmacological treatment is the prevention and the reduction of fractures.

Bisphosphonates (BF's) are drugs that inhibit bone resorption being a reference in the treatment of osteoporosis. BF are synthetic analogs of inorganic pyrophosphate (PPi), where the oxygen atoms is replaced by a carbon atom (P – C – P), forming compounds with stable, anti-demineralizing properties, resistant to enzymatic action by alkaline phosphatase.

BF's prevent calcification acting as crystals after adsorption on the bone surface. They also inhibit the reabsorption of bone by osteoclasts cells.

BF's are administered orally, and may cause gastrointestinal intolerance manifested by abdominal pain, nausea, vomiting, diarrhea and constipation. Esophagitis, dysphagia and esophageal or gastric ulcers may also occur.

Keywords: Osteoporosis, fracture, Bisphosphonates

PHENYTOIN IN THE TREATMENT OF EPILEPSY

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Epilepsy is a cerebral disorder caused by abnormal energy discharges, having as main characteristics the recurrence of convulsive crises, being able to vary its physiopathological characteristics according to the area of the brain affected.

The major classes of drugs used include phenytoin, carbamazepine, valproate, phenobarbital. Phenytoin was the first non-sedative drug in the arsenal of anticonvulsant drugs with a Spectrum of action. Its mechanism of action occurs by affecting the excitability of the action on the sodium channels dependent on voltage.

The molecular mechanism for this is a voltage-dependent blockade of membrane sodium channels responsible for the action potential. Through this action, phenytoin obstructs the positive feedback that underlies the development of maximal seizure activity, while normal brain activity, proceeding at lower neuronal firing rates, is spared its depressant action. Other mechanisms of action that may contribute to the drug's efficacy and selectivity are also discussed.

Keywords: Anti-convulsionaries, Anti-epileptics, Epilepsy, Phenytoin

DESMOPRESSIN ACETATE IN HEMOPHILIA TREATMENT

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Hemophilia is characterized by being a rare hereditary disease in which the blood doesn't coagulate normally, since there aren't sufficient coagulation factors. In this disease, after an injury, it can bleed for longer than normal, which is worrying if the bleeding is internal, which can become fatal, as it can damage the organs and tissues.

One of the drugs used in the treatment of this disease is Desmopressin Acetate (DDAVP), which is a synthetic analogue of vasopressin (antidiuretic), without having the vaso-pressure effects and whose mechanism of action is still not well established. However, it is known that the haemostatic effect is related to the increase in plasma levels of factor VIII, released from the vascular wall reservoirs, with the increase in plasma levels of von Willebrand factor, exiting vascular endothelial cell vessels and platelet granules, increased plasma levels of tissue plasminogen activator and increased platelet adhesion.

Regarding the side effects of DDAVP, these are of little relevance (facial flushing, headache, hypotension / hypertension, and tachycardia). Ingestion of liquids should be restricted to the smallest amount possible during use of this drug. DDAVP is contraindicated in patients with a history of seizure disorder, patients with hypertension and / or heart disease, patients who developed thrombocytopenia after a "dose-test" and patients with polydipsia.

In summary, the administration of this drug can help prevent excessive bleeding, thus reducing hospital time and limiting side effects such as joint damage.

Keywords: Hemophilia, Desmopressin Acetate, Coagulation Factor

TREATMENT OF MIGRAINES WITH AURA

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Migraine is a neurological disease, characterized by episodic headaches, which frequency and durability can vary, intercalated with periods totally asymptomatic.

Its symptoms are characterized by a pulsatile hemicranial pain, that can be accompanied by nausea, vomiting, photophobia, phonophobia and intolerance to some odors.

Migraine aura is a migraine type, which includes transitory neurological symptoms, originated in certain encephalic areas and its diagnosis is essentially clinical.

There is no cure for migraine aura. Frequently, preventive treatments or reductive of symptoms are used. Before any specific therapeutic, we should start with general measures.

There are two types of treatments. Non-pharmacological treatments consist in specific relaxation techniques, biofeedback techniques, psychotherapy, acupuncture and cognitive-behavioral techniques. Pharmacological treatment may be symptomatic and/or prophylactic.

Symptomatic treatments, like analgesics or AINEs, are used when crises are mild to moderate.

If crises are moderate to severe, an association of symptomatic and prophylactic treatments is used. The treatment choice, which is specific for migraine, depends on migraine type, intensity and symptoms, and associated diseases. Examples of such drugs are triptans, which have a vasoconstrictor effect. In migraine aura, the triptans should be administered after the aura phase. When crises are severe and prolonged, the patient may be hospitalized and corticosteroids, serotherapy and benzodiazepines should be used.

If migraine crises appear more than twice a month, if it is severe and interferes with patient life quality, a prophylactic treatment should be prescribed. Beta-blockers, anti-epileptics and calcium channel inhibitors are also used as preventive therapy.

Keywords: Migraine aura, Treatment, Prophylactic, Symptomatic, Triptans

ALOPECIA AREATA: TREATMENT WITH TOFACITINIB***Diogo Silva, Duarte Melo, Tiago Monteiro, Jorge Balteiro****Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Farmácia, Portugal*

Tofacitinib is an available drug that belongs to a new category of non-biological drugs, the "JAK inhibitors". This drug is already used to treat other diseases, such as rheumatoid arthritis. Recently, oral and topical formulations of Tofacitinib have shown to be safe and effective, despite the side effects presented in all drugs, this one shows to be a potential drug for the treatment of Alopecia Areata (AA), in several clinical trials. Alopecia Areata is an autoimmune disease with strong associations with genetic loci in the proximity of genes with immunological functions. Studies on the immunological functions that may be correlated with the pathogenicity of this disease are part of an active research area, where Janus Kinases (JAK) inhibitors are objects of an intense investigation, as they represent potential therapeutic targets, mainly because it's where Tofacitinib inhibits the JAKs and consequently disrupts intracellular signaling and can suppress the activation of immune cell and the consequent inflammation.

Thus, we concluded that this drug, despite being recent in the treatment of Alopecia, has shown very efficiency in the tests that were already carried out. Which shows that this drug has potential and may be on the verge of being the key to the treatment of Alopecia Areata.

Keywords: Tofacitinib, JAK inhibitors, alopecia areata, treatment, hair loss

PSORIASIS TREATMENT WITH ADALIMUMAB

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Psoriasis is a chronic and inflammatory, non-contagious disease, the main manifestations of which are cutaneous and articular.

Psoriasis is a disease that has no cure, however the currently available treatments are effective in controlling symptoms, which improves the quality of life of patients. There are topical and systemic treatments.

Adalimumab is an example of systemic treatments. Is a combinant human monoclonal antibody whose mechanism of action relies on binding specifically to TNF by neutralizing its biological function and blocking its interaction with p55 and p75 TNF receptor on the cell surface. It also modulates the biological responses induced or regulated by TNF, including changes in the levels of the adhesion molecules responsible for leukocyte migration.

The route of administration is exclusively subcutaneous and the dosage of 80mg followed by 40mg one week after the initial dose. As maintenance, 40mg is given every other week.

As contraindications there is hypersensitivity to the drug or any of its excipients; Active infection and live attenuated vaccines; Recent neoplasia; Pregnancy or breastfeeding; ICC; and demyelinating disease.

The most frequent adverse reactions include reactions at the injection site; Infections; tuberculosis; Skin reactions; Neoplasms; Demyelinating diseases; ICC; Antibodies and lupus-like syndrome; Hepatotoxicity;

The main drug interactions are other immunosuppressive drugs, due to the high risk of associated infection.

Although recent and of long-term toxicity still unknown, these new drugs have been shown not only in the improvement of the disease, but also in the safety and tolerability of conventional drugs.

Keywords: Psoriasis; Monoclonal; Adalimumab; Treatment

ERECTILE DYSFUNCTION – SILDENAFIL

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Erectile dysfunction is a chronic disease characterized by persistent inability to have or keep a strong erection for a good sexual relation which occurs when the blood that flows to the penis isn't enough to cause an erection.

The treatment that is the most effective for the erectile dysfunction is Sildenafil and it's an oral therapy. In normal circumstances, with sexual stimulation, erectile function is reestablished by the increase of blood flow on penis.

The physiologist mechanism responsible for penis erection involves a nitric oxide release on corpora cavernosa during a sexual stimulation. Nitric oxide activate a guanylate cyclase enzyme that induces an increase of the GMPc (guanosine monophosphate cyclic) levels, causing a relaxation of smooth muscles of corpora cavernosa that allows blood influx. Sildenafil is a powerful and selective inhibitor of phosphodiesterase type 5, specific of GMPc on corpora cavernosa, where PDE5 is responsible for GMPc degradation.

Trough clinical tests, it is verified that there is no toxicity in a long time for fertility but like all the others pharmaceuticals, this is not an exception and it presents some adverse effects like headache, cardiac arrhythmias, so it isn't advisable to people with cardiac problems.

Keywords: Erectile dysfunction, Sildenafil, GMPc, PDE5

EPITHELIAL TISSUE

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The epithelial tissue is one of the main groups of cellular tissues, its main function being to coat the external surface, some organs and several internal cavities of the organism. The epithelial tissue has an embryonic origin in the three primary germinative layers: Ectoderm, Mesoderm and Endoderm. Epithelial cells are intimately linked to each other (juxtaposed) due to the small amount of intercellular material, their nourishment is assured by the diffusion of substances from the underlying connective tissues through the basement membrane since it is a non-vascularized tissue. The epithelium, has several functions, such as protection of the body, absorption of substances, perception of sensations and it is also responsible for the formation of some glands. According to their function, the epithelia are divided into two major groups: lining epithelium and glandular epithelium. The lining epithelia can be classified according to the number of cell layers: simple, stratified and pseudostratified, and by the shape of their cells: pavement, cubic, prismatic and transition, while glandular epithelia are cells specialized in the secretion of products and we can further classify them by exocrine glands, endocrine glands or mixed glands.

The aim of this project is to characterize the epithelial tissue and to describe its different types.

Keywords: Epithelial tissue, Tissues, Epithelial cells

CONNECTIVE TISSUE

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The connective tissue is morphologically characterized by several types of cells immersed in a large amount of extracellular material, amorphous substance or matrix, which is synthesized by the tissue cells themselves, the conjunctive term means "uniting" or "connecting."

There are several genres of connective tissues: the proper connective tissue and the special ones, which fit into the adult connective tissue, in addition, the embryonic connective tissue which includes the mesenchyme and mucous membrane. In the proper connective tissue we have the loose connective tissue that is composed by cells, intercellular fibers and fundamental substance or basal. The dense connective tissue is prepared to offer resistance and protect the tissues due to the predominance of collagen fibers. According to the organization of these fibers, it can be classified as regular and irregular.

The connective tissue also has special connective tissues where the adipose, cartilaginous, bone, hematopoietic and blood tissues are encompassed.

The connective tissue exerts several important functions in the organism, from which stand out the support of other tissues and organs of the body as a whole, the filling of spaces between other structural tissues and adhesion between tissues for an organization of organs, blood vessels, lymphatic vessels and nerves also play an important role in nourishing cells from other tissues.

This work aims to elucidate the constitution and formation of connective tissue.

Keywords: Connective Tissue, Histology, Audiology

CARTILAGINOUS TISSUE

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The cartilaginous tissue, or merely cartilage, it's a specialized form of connective tissue derived from mesenchyme (embryonic connective tissue). It is constituted by cells called chondrocytes, which are lodged in small cavities called gaps, and by a great amount of extracellular matrix that presents rigid consistency. It possesses a slow healing for being avascular, it's white or greyish, and it adheres to the articular surfaces of bones. In the cartilages there are no nerves, neither sanguineous or lymphatic vases. The cartilaginous tissue has as function the sustentation and the covering of the articular surfaces facilitating the movements and is basic for the growth of the long bones.

There are two forms of cartilage growth: interstitial growth, that occurs by mitotic division of chondrocytes and the growth by differentiation of cartilaginous cells that have capacity to develop themselves in chondrocytes.

There are three types of cartilage: hyaline, elastic and fibrous. They differ essentially in the histological appearance and properties of the extracellular matrix, however the hyaline cartilage is most common and characteristic.

The cartilaginous tissue is found in the nose, in the rings of the trachea and the bronchis, in the auricle (pinna), epiglote and some parts of the larynx. Moreover, there are cartilaginous discs between the vertebrae that cushion the impact of the movements on the vertebral column.

In the fetus, the cartilaginous tissue is very abundant, because the skeleton is initially formed by this tissue, and then later is largely replaced by the bone tissue.

With this work we intend to characterize the cartilaginous tissue and its different types and functions.

Keywords: Cartilaginous tissue, Cartilage, Mesenchyme, Chondrocytes

BONE TISSUE

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The bone tissue is a specialized type of connective tissue, formed by cells allied to a calcified extracellular matrix, the bone matrix, which consists of an organic part and an inorganic part. The only form of nutrition of these cells is through canaliculi through which capillaries pass, since the calcified matrix does not allow the diffusion of substances until the cells. The canaliculi allow ion and molecule exchanges between the bone cells and the capillaries.

Bone tissue is the main constituent of the skeleton and its functions are to protect and sustain the organs, to lodge and protect the bone marrow and to support the muscles, allowing a system of levers that reinforces the movement and the forces generated during the muscular contraction. Bone tissue is a good deposit of calcium, phosphate and other ions used in the body's metabolism and proper functioning.

In this type of tissue are found three cell types, osteocytes, osteoclasts and osteoblasts.

Bone growth is controlled by adenohipophysis hormone, and there are two mechanisms of growth: 1) growth in diameter of the long bones, where growth occurs equally throughout the bone, where new layers of osteocytes are placed on the bone Pre-existing; And 2) the diameter growth of the diaphysis, where new bone is deposited in the periphery, while the older bone is absorbed in the inner portions.

Among the pathologies of the bone tissue, one of the most well-known pathologies is osteoporosis, where the bone mass decreases, which leads to a lower bone resistance and, therefore, a greater probability of occurrence of fractures; Another pathology of bone tissue is imperfect osteogenesis, in which bones break down more easily, and can affect the fetus still in the womb or just after birth.

In this work we intend to talk about bone tissue, its growth, development, destruction and death, as well as to present some pathologies.

Keywords: Bone Tissue, Bone Growth, Osteoporosis, Imperfect Osteogenesis

ADIPOSE TISSUE

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The adipose tissue comes from a differentiation of the connective tissue and the aggregation of adipose cells, the adipocytes. This tissue is found in the body, and in people with normal weight it corresponds to 20-25% in women and 15-20% in men.

In most mammals, there are two types of adipose tissue that differentiate by location, structure, physiology and pathology. The first one is common adipose tissue, yellow or white and unilocular (the cells contain only one fat droplet that fills the whole cytoplasm), are large in size having spherical shape when isolated. The other one is brown adipose tissue, multilocular (the name is characterized by the colour, which derives from the rich vascularization and the presence of numerous mitochondria and many lipid droplets inside the cells).

It is important to emphasize that the innervation of both types of tissues is made by sympathetic fibers of the autonomic nervous system, for thus the organism has a mechanism that allows corporal adjustments, thus maintaining the balance of the body: homeostasis.

Many animals nourish themselves slowly, but they are in constant consumption of energy and for that the adipose tissue serves like reservoir of greater capacity of the body. To do this, it has the functions of energy deposition in the form of triglycerides, production of heat through thermal insulation and, by locating subcutaneously by modelling the surface of the skin.

Our main goal is to elucidate the knowledge about adipose tissue, to characterize and demonstrate its importance in humans.

Keywords: Adipose Tissue, Unilocular, Multilocular

MUSCLE TISSUE

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Muscle tissue is a soft tissue that composes muscles in animal bodies, and helps increasing the muscles' ability to contract, being related to locomotion and other movements of the human body. It is of mesodermal origin.

Muscle tissue divides into striated muscle (Skeletal and cardiac) and smooth muscle. Skeletal muscle tissue forms in embryonic life through the fusion of myoblasts. It constitutes the major part of the vertebrate body's musculature and is responsible for body movements. It has three main functions: 1) it acts to produce movement, 2) provides stability and 3) produces heat, being important in the regulation of body temperature. Cardiac muscle tissue is found in the walls of the myocardial heart, presents involuntary contraction, in other words, it does not depend of individual's will. The striated muscle cell presents, in its cytoplasm, packages of very fine contractile fibers, the myofibrils, arranged longitudinally. Each myofibril corresponds to a set of two main types of proteins: myosin (thick), and actin (thin). These proteins are organized in such a way that they produce transverse bands, light and dark, characteristic of striated muscle cells. Smooth muscle tissue is composed of mononuclear and elongated cells, dense at the center and thin at the extremities. When a few cells contract, these fibers cause contraction of all the muscle. This tissue can be found in the walls of internal organs, and structures such as the stomach, intestine, lungs, and blood vessels. Smooth muscle cells do not show transverse streaks as seen in striated muscle cells. The absence of these stretch marks happen, because the actin and myosin filaments do not organize following the same pattern.

The purpose of our work is to differentiate the various types of muscle tissue by characterizing histologically each one of them.

Keywords: Muscle tissue, Mesodermic, Striated muscle, Smooth muscle

NERVOUS TISSUE

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The nervous tissue consists of nerve fibers which have the extent of neurons. These are formed by the dendrites, the axon and the cell body or pericardium that contains the nucleus and from which the prolongations depart. In the central nervous system, these fibers conduct the nervous impulses from the dendrites to the axons.

The nervous tissue is distributed throughout the organism and interconnects forming a communication network that constitutes the nervous system, originating from the ectoderm.

The nervous system is divided into two: the central nervous system (CNS), consisting of the encephalon and the spinal cord; and the peripheral nervous system (PNS), formed by nerves and nervous ganglia.

In the PNS we have neurons which can be classified according to their morphology or function; within the morphology, we have the multipolar neurons (constituted by two or more prolongations), the bipolar neurons (constituted by a dendrite and an axon) and the pseudounipolar neurons (constituted by a single prolongation near the cell body); as for functionality we have the motor neurons, the sensory neurons and the interneurons.

In the CNS we can observe two substances in its constitution: 1) the white substance, which consists of the prolongation of neurons, the glial cells and the myelin; and 2) the grey substance, consisting of glial cells, neuronal cell bodies and their extension.

With the accomplishment of this assignment we intend to deepen the knowledge in the area of histology of the nervous tissue.

Keywords: Nervous Tissue, Nervous Cell

NERVOUS TISSUE OF THE EAR

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The hearing organ is divided into 3 parts, although the most related to our subject is intern ear.

The inner ear origins specifics nerve impulses that are conducted to the central nervous system by the auditory nerve. It is consisted by osseous labyrinth, where we have the vestibule that lodges the saccule and the utricle, suspended at the cavities of the temporal bone which is also consisted by canals, hence the inner ear may also be named labyrinth. Although there is a space between the membranous labyrinth and the osseous, it's a continuation of the meninges subarachnoid space and it's full of a fluid, known as perilymph. The perilymph has similar composition to the cerebrospinal fluid.

The organ of Corti is an organ of a complex structure, sensitive to the vibrations induced by sound waves.

The epithelial cell complex highly specialized extends itself through the entire cochlea and it's where we find the stereocilias, there's two types, internal stereocilias that are disposed on a single row along the whole length of the cochlea, and the external stereocilias that are disposed on three rows. The synaptic area of the intern stereocilia extends itself from the base of the cell till the cell nucleus. The endings that connect the internal hairy cells are, in it's majority, widely vesiculated and considered endings of the cochlear nerve. The basal part of the hairy external cell receives synapses from the afferent and efferent nerve fibers.

The objective of our work is to study the nervous tissue of the ear to a better understanding of how the nervous information is transmitted in the inner ear.

Keywords: Nervous cell, Corti's organ, Stereocilia

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BENCHMARKING IN HEALTH

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Benchmarking is a process of comparison of products, services and business practices, being an important tool in company management.

Applied to the public sector, benchmarking proves to be a powerful incentive to improve service performance, as an alternative to market competition which is absent in this sector.

Regarding health, this technique has as main objective to support hospitals and the Regional Administrations of Health (ARS) in the development of their Strategic Plan. It allows identification of good practices that can be adopted by public services, improving their performance and, through a more efficient management of their resources, offering potential savings/reduction of costs; Improving the quality of service provided to users, particularly in terms of access; Evaluating the improvement potential of each hospital in each of the main areas of activity; Identifying "best practices"; Identifying current management levers, and transverse programmes that identify the potential for improvement and, thus, are able to recognise particularly relevant aspects in terms of improving the economic and financial performance of the institutions.

The Central Administration of the Health System (ACSS) will provide quarterly benchmarking reports, which allows analysis of longitudinal trends. In this way, clinical quality indicators will be progressively expanded, ensuring their comparability and reliability. This approach will strengthen the flexibility of the health system, allowing, in the long term, an informed choice of the patient between different public healthcare providers.

Keywords: Benchmarking, Healthcare Quality, Healthcare Improvement, Healthcare Performance, Healthcare Comparison

HEALTH QUALITY

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The quality of health care is important to make what happens inside an organization visible, and to show the level of quality in which it is operating and what can be done to improve its performance.

With our study, we intended to demonstrate the quality of the health care system in Portugal, through the analysis and comparison of several bibliographical references, as well as the cabinet order no. 5613/2015, of May 27 and the internet portal of the General Directorate of Health (DGS). The selected study was conducted by the DGS in 2015 on the Portuguese population. After analyzing the results, it was verified that 36% of the people who answered the inquiry rated their health as "good" and that 75% of the population used public health services. To what access to health care is concerned, it is verified that about 44% of the people who answered waited less than four weeks for a specialized doctor's appointment. On the other hand, 74.0% of the individuals considered that their health problem was adequately solved by the health care providers and that the time spent with the doctor satisfied 87.4% of the people who answered the inquiry. To what the quality of the functioning of the Portuguese Health Care System is concerned, it is observed that approximately 43% of users say that this system works well or requires small adjustments.

Therefore, it is essential to promote an effective evaluation of the quality and safety of health care, guaranteeing the rights of all citizens. Only guaranteeing this, it is possible to have a continuous improvement on the culture of quality in the health care system.

Keywords: Quality; Health; Quality in Health; Certification; Accreditation

HUMANIZATION OF HEALTH IN PORTUGAL

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Humanization is the action or effect of humanizing. And humanizing is characterized as the act of "making human, becoming sociable, and becoming more compassionate." Currently, the term humanization is applied to situations that value care in the technical and scientific dimensions and recognizes the patient's rights, respecting individuality, dignity, autonomy and subjectivity, without forgetting professional recognition.

Health is the state, and simultaneously, the mental representation of the individual condition, control of suffering, physical well-being and emotional and spiritual comfort. In so far as it is a mental representation, it is a subjective state; Therefore cannot be taken as a concept opposite to the concept of disease.

We can say that humanization network in health is a network of permanent construction of ties of citizenship, a way of looking at each individual in its specificity, its life history, but also of looking at it as a subject of a collective, subject of the story of many lives.

It is thus easily concluded that it is difficult to define the word "quality" when it comes to health. It is a very broad subject, but not very concrete, leading to different and varied perspectives of evaluation of the same.

Keywords: Health, quality, humanization, relationship and proximity

NATIONAL HEALTH PLAN - REVIEW AND EXTENSION TO 2020

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The National Health Plan continues the vision established in previous plans, that is to maximize health gains through the integration of sustained efforts in all sectors of society, and the use of strategies based on citizenship, equity and access, quality and sound policies.

It is proposed to reduce premature mortality, below 70 years, to improve healthy life expectancy at age 65 by 2020, and to reduce risk factors related to noncommunicable diseases, specifically childhood obesity and obesity. Consumption and exposure to tobacco, in order to obtain more value in health.

This work aims to make known the mission of the NHP, as well as its objectives and values. The methodology used was based on the systematic review of scientific articles, as well as works developed in this area and other sources of information on the subject.

The NHP: Review and Extension to 2020 was an aggregator and guideline of the measures considered more relevant to obtain more health gains by the population residing in Portugal, thus maintaining the focus that the plan previously had with reduce and minimize existing inequalities.

Keywords: National Plan for Health, Quality, Sustainability

STRATEGIES FOR THE PROMOTION OF QUALITY IN HEALTH

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Quality in health emerges as a requirement of all those involved in health care, and is seen as an essential attribute. It distinguishes itself from other sectors by satisfying and reducing needs, being proactive in preventing and responding, and has attributes as effectiveness, efficiency, acceptability and equity.

The main objective of this work is to raise awareness about health quality and disseminate strategic principles and new goals to promote the quality of health care services.

As methodology used, it was based on the analysis of scientific articles and applicable legislation on the subject.

The results of this study indicate which strategic priorities, targets and action for Health Quality 2015-2020 and also, in relation to the National Plan for Patient Safety, what the strategic objectives and their targets for 2020 are.

We can conclude that the continuous improvement of quality in health is essentially a process of change. Managing this change process represents a great challenge because creating and developing a culture of quality in health is a task and a challenge that we individually and collectively must take on.

Keywords: Quality, Health, Strategies

THE PORTUGUESE HEALTH SYSTEM

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The National Health Service (NHS) is a structure through which the Portuguese State assures the right to health (promotion, prevention and surveillance) to all citizens of Portugal. The NHS involves all integrated health care, including health promotion and monitoring, disease prevention, patient diagnosis and treatment, and medical and social rehabilitation. It states that access is free of charge but that provision may be made for the imposition of user charges, to rationalize the use of services.

The objectives of this paper are essentially to explain what the NHS consists of, how it functions as a complex organization, how it is administered, how it started and, most importantly, how its creation has improved the health of the population.

The methodology for the accomplishment of this work was based on the revision of scientific articles, works and other sources of information related to the subject.

The NHS is managed by the concepts of mission, vision, objective and strategies, with a primary focus on developing deep primary care and continuing care and achieving a relevant improvement in the functioning of hospitals.

Through the creation of the NHS and its conceptions, Portugal has distinguished itself as one of the countries with the best relationship between health outcomes and health expenses and has been achieving continuous improvement of its health outcomes.

Keywords: National Health Service; Integrated Health Care; Right to Health

VESTIBULAR MIGRAINE IN TEENAGERS

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Background: Vestibular migraine usually occurs in young girls and is often associated with arrival of puberty and menstrual periods. Episodes of vertigo (nausea and vomiting) are associated with headache and photophobia. Objective: To determine the prevalence of migraine in adolescents. Material and Methods: In a sample of 33 adolescents, were made a questionnaire based on International Society of Migraine, an audiological screening and the mCTSIB test. Results: It was found only one case of possible migraine what reveals a migraine prevalence of 3.0% in total sample and 6,25% in female. The adolescent affirmed she had headaches, more than five times a year, more than 72 hours, bilateral, persistent and moderate intensity, but without getting worse with physical activity. She also affirmed feeling uncomfortable with loud noise, photophobia and bilateral blurred vision and has sleeping problems. At the same time, with the headache, she also feels dizziness lasting for 5 minutes. The dizziness do not prevent her to have a normal life, doing her everyday tasks. The adolescent had her first menstrual cycle about 4 years ago, but she doesn't take the pill yet. About her audiological evaluation, otoscopy and tympanogram were normal on both ears. The audiological screening reveals she don't hear 20 dB the frequencies of 4000/6000 Hz, bilateral. The mCTSIB test reveals a lower oscillation comparative with other adolescents without possible migraine. Conclusion: Our study shows higher prevalence in female and that adolescents with migraine may have "fear" about their movements.

Keywords: Migraine, vertigo, postural balance, hearing screening

AUDITORY MEMORY: DIFFERENT BILINGUAL COMMUNITIES

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Background: Auditory -verbal memory (phonological memory and articulatory component) helps us make sense of what we hear. Bilingualism is defined by the use of at least two languages.

Objective: To know if bilingual people have better auditory memory than those with just one mother tongue.

Material and Methods: The study is made up of 41 individuals: 15 students with only one mother tongue (European Portuguese); 15 students with Creole as their mother tongue (in speaking skills) and learned European Portuguese; and 11 bilingual students in European Portuguese and learned another language in at least 4 years. It was given a test of pseudowords auditory memory, in silence and with noise

Results: The group of bilingual people obtained the best results in the applied tests, namely in auditory memory test. Although the other two groups didn't show statistically significant differences among the study groups. In the group with Creole as mother tongue it was found a moderate correlation between the duration pattern test and the auditory memory test, both in silence and with noise.

Conclusion: Our results coincide with the international studies that claim that bilingual people may show better performance in certain cognitive tasks, in particular, those that measure the ability to ignore information. A possible explanation is the fact that their brain plasticity has been shaped by two mother languages' phonemes, i.e. a greater number of phonemes. This situation that does not happen in the Cape Verdean Community since Creole has its greatest origin in the European Portuguese.

Keywords: Auditory Memory, Bilingualism, Auditory Processing, Pseudowords

CUSHING SYNDROME

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Cushing's syndrome is an endocrine disorder caused by prolonged exposure of the body's tissues to high levels of cortisol (a hormone produced by the adrenal gland). Cortisol plays a variety of roles in your body, for example, cortisol helps regulate your blood pressure and keeps your cardiovascular system functioning normally. It also helps your body respond to stress and regulates the way you convert (metabolize) proteins, carbohydrates and fats in your diet into usable energy.

This syndrome can develop from a cause outside of our body (exogenous Cushing syndrome), like taking medicines or may also be due to our body's own overproduction of cortisol (endogenous). This may occur from excess production by one or both adrenal glands, or overproduction of the adrenocorticotrophic hormone (ACTH), which normally regulates cortisol production. In these cases, Cushing syndrome may be related to a pituitary gland tumour, an ectopic ACTH-secreting tumour, a primary adrenal gland disease or familial Cushing syndrome. It usually affects adults between 20 and 50 years. Signs and symptoms of Cushing's syndrome include upper body obesity, fatigue, high blood pressure, backache, high blood sugar, easy bruising and bluish-red stretch marks on the skin. The diagnosis may be difficult to make because sometimes the hormone elevations come and go: so called "cyclic" or "periodic" Cushing's disease. Normal circadian rhythm of cortisol secretion is lost in patients with Cushing's syndrome. However, it can be done with some tests like 24-hour urinary free cortisol level, cortisol saliva testing and direct visualization of the endocrine glands.

Keywords: Endocrine disorder; cortisol; circadian rhythm

RESPIRATORY FUNCTIONAL TESTS

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The respiratory system is responsible for gas exchange between alveolar membranes and capillary, where good irrigation and ventilation of the alveoli are expected. However, it's possible that some areas of the lungs are well ventilated and poorly irrigated, or vice versa.

In this context, the respiratory functional tests (RFT) that evaluate changes of the ventilation and respiratory function appear. The RFTs are important in assessing the evolution of certain diseases, such as asthma, chronic obstructive pulmonary disease (COPD) and restrictive lung disease, through the determination of lung volumes, since the mechanical behavior of the lung depends on its elastic properties and volume.

There are several tests that evaluate different aspects of lung function.

Spirometry measures the volume of inspiratory and expired air over a given period of time, allowing the study of lung volumes and volumes that can be mobilized. Plethysmography determines residual volume and forced residual capacity, reporting directly on the degree of pulmonary insufflation. The diffusion of Carbon Monoxide (CO) allows to assess the volume of CO transferred per minute from the alveoli into the blood. Arterial blood gases allow measurement of parameters present in a blood sample, such as partial pressures of oxygen and carbon dioxide and pH. The bronchodilation test is used when there is obstructive ventilation, evaluating the bronchodilator response of the organism to a given drug. Impulse oscillometry allows to measure mechanical properties of the lung and chest, measuring resistance to air passage in the airways. Bronchopathy evaluates hyperresponsiveness or reactivity of the airways.

Keywords: gas exchange, alveolar membrane, pulmonary function, spirometry, plethysmography

ERYTHROPOIETIN - PHYSIOLOGY AND PATHOPHYSIOLOGY OF ABUSE

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Erythropoietin (EPO) is a glycoprotein hormone, belonging to the group of cytokines, synthesized mainly in the kidney (epithelial cells of the peritubular capillaries of the renal cortex and interstitial fibroblasts) but also, to a lesser extent, in the liver. EPO is responsible for the regulation of erythrocyte production (erythropoiesis) whose main function is the transport of oxygen.

Hypoxia is the main stimulus for its production, and when the sensors of renal cells detect this, there is an increase in the hypoxia-1 inducible factor (HIF-1), and, consequently, EPO synthesis occurs.

The produced EPO molecules are carried to the bone marrow, where they bind to specific receptors of erythrocyte colony forming cells (CFC-E) membranes, derived from hematopoietic pluripotent stem cells. CFC-E, activated by EPO, generates erythrocyte precursor cells, which also depend on EPO for their differentiation and proliferation. The hormone stimulus continues until the level of tissue oxygenation returns to normal.

EPO has been synthetically produced for use in persons with certain types of anemia resulting from chronic renal failure, Crohn's disease, myelodysplasias, among other conditions, in order to stimulate erythropoiesis, increasing the number of erythrocytes.

The use of EPO in sports is considered doping because it increases the concentration of erythrocytes and the oxygenation of muscle tissue, improving physical endurance and athlete performance.

The excessive use of EPO causes increase in blood viscosity, of platelet aggregation, as well as increased blood pressure and volume. These mechanisms, acting together, increase the cardiovascular risk and the risk of death.

Keywords: Erythropoietin; Erythropoiesis; Anemia; Sports; Risk.

HORMONAL FUNCTION OF GONADS: TESTOSTERONE vs PROGESTERONE

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The gonads are tissues in the body that possess the enzymatic apparatus to convert cholesterol to steroid hormones. These hormones, who share a common biochemical parentage, are progesterone and testosterone. The first is produced in the ovaries and the second in the testes. Progesterone increases secretions in the fallopian tube and in the endometrium, to prepare for fecundation and the implantation of the uterus, stimulating the secretion of milk and the development of a secretion system in the breasts. It also decreases the maternal immune response and has an anti-mitogenic effect in endometrial epithelial cells. Testosterone promotes the development of the male's reproductive system and secondary sexual characteristics.

The functionality of the gonads is regulated by trophic hormones released from the pituitary, which are known as gonadotropins. Gonadotropins, including mammalian hormones follicle-stimulating hormone (FSH) and luteinizing hormone (LH) are regulated by gonadotropin-releasing hormone (GnRH), released hypothalamic neurons. Increasing of GnRh subsequently increases FSH and LH production.

In woman, the levels of gonadotropins released depends on the phase of their menstrual cycle. FSH is responsible for follicular growth, estrogen and progesterone production. In men, FSH stimulates Sertoli cells, part of seminiferous tubules, to initiate spermatogenesis and to produce inhibin. This protein, also secreted by ovarian follicular cells in woman, is responsible for a negative feedback to control the pituitary FSH secretion.

In men, LH, will determine the rhythm of synthesis and secretion of testosterone by Leydig cells. In woman, it triggers ovulation and the development of the corpus luteum.

Keywords: gonads, steroid hormones, gonadotropins

ASTHMA MECHANISMS

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Asthma is a chronic inflammatory disease of the lungs's airways characterized by inflammation and consequently narrowing of the bronchial tubes and trachea in response to various stimuli such as allergens, dust mites or pollens. The inflammatory response to these stimuli includes tissue damage, edema and mucus production, which can tighten the airways and decrease the effectiveness of breathing.

Common asthma symptoms include coughing, especially at night, wheezing, shortness of breath, chest tightness, or simply feeling tired.

The inflammatory process characteristic of asthma involves multiple cells and mediators, leading to infiltration of neutrophils and eosinophils, degranulated mast cells, loss of integrity of the bronchial epithelium, thickening of the basement membrane, occlusion of bronchial lumen by mucus, hyperplasia of goblet cells and hypertrophy/hyperplasia of the peribronchial smooth muscle. Allergenic stimulation of the asthmatic airways leads to an increase in Th lymphocytes. Ingested proteins are degraded in the endosomes and some resulting antigenic peptide fragments fix to MHC class II, where T Helper lymphocytes recognize them and are activated. Cytokines that stimulate the proliferation of Lymphocytes and activate the differentiation of B lymphocytes into plasma cells are released, inducing immunoglobulin secretion, which activates some mediators, such as Histamine, among others.

Given that there is no cure, avoiding exposure to smoke and allergies, using bronchodilators, corticosteroids or mast cell stabilizers may be the most effective ways to prevent and to treat asthma. Physiotherapy, with techniques of breathing exercises and muscle stretching, for example, can be part of the treatment, thus increasing the patients' comfort and lives.

Keywords: Asthma; airways; disease

AUTOIMMUNE DISEASES

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Autoimmune disease can be defined as the loss of immunologic tolerance towards the body, being a specific immune answer against an antigen or a series of self-made antigens. The immune system acquires self-tolerance when occurs clonal removal of the self-reactive T lymphocyte, self-reactive B lymphocyte or by functional suppression of the T and self-reactive B lymphocytes.

The immunologic tolerance is divided in central tolerance and peripheral tolerance. Central tolerance is a mechanism that stops the T and B cells from being reactive to the individual. Unlike this tolerance, in which the cells can be found in the primary lymphatic organs, on the peripheral tolerance this maturation occurs in the periphery.

There are many factors that unleash this disease, including genetic factors (since certain gene combinations create a bigger predisposition for the development of this pathology), environmental factors (climate and the contact with infectious agents increases the risk for its appearance and development) and physiologic factors (because it's considered a psychosomatics disease by a lot of specialists, physiologic factors like emotional changes that causes imbalances, stress and anxiety also increases the chances to occur this disease).

Examples of some of the most known diseases are:

Systemic lupus erythematosus (SLE), popularly known only as lupus, can affect mainly skin, joints, kidneys, brain but also all other organs.

Another is rheumatoid arthritis, whose synovial membrane has newformed vessels and large inflammatory cells - pannus, where it would normally have two layers of fibroblastic lineage cells and some of the macrophagic lineage

There is also Diabetes type 1 - Diabetes mellitus, where the increase in glucose levels in the blood, derived from not using it for energetic uses, is caused by the development of autoimmune antibodies that trigger the destruction of beta cells producing insulin in the pancreas.

Keywords: immunologic, self-tolerance, systemic lupus erythematosus, rheumatoid arthritis, diabetes type 1

DIABETIC FOOT

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Diabetes is a metabolic condition in which the amount of glucose in the blood is abnormally high. The pancreas doesn't produce enough insulin, leading to excessive glucose levels in the bloodstream and thereafter in the urine. It can be caused by the reduction of insulin discharge or by its faulty action, due to the insensitivity of the receptive tissues.

There are two types of diabetes: type 1 in which the immune system destroys cells that produce insulin, making the body insulin-dependent. In type 2 diabetes, the body isn't able to use insulin the right way.

Diabetes affects the patients' feet by damaging the vast nervous branch of the foot, responsible for the foot's sensitivity. The evolution of the disease, if not treated right, can cause nervous damage, that is, changing the feet sensitivity and/or reduction of the amount of blood transported, better known as "bad circulation".

This can cause small foot wounds that, can cause infections.

The hardening of vessel walls, in addition to their occlusion, makes any type of wound or infection harder to heal, since the nutrients responsible for healing that are carried by the blood diminish, due to the lack of blood supply in the area; this can also cause ischemia and thrombosis. On worst case scenarios, because of the severity of the condition, patients' foot/feet may have to be amputated; physiotherapists have an important role in biopsychosocial recovery of these patients (preparation to the prosthesis or other procedures if the patient isn't able to use one).

Keywords: Diabetes; Glucose; Insulin; Foot; Circulation

DIABETIC NEPHROPATHY AND DIALYSIS

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Diabetic nephropathy is a progressive kidney disease affecting kidneys vessels, such as the capillaries in the kidneys' glomeruli. Some of its causes include hyperglycemia (due to lack of insulin production in type I diabetes, or to deficient insulin action in type II diabetes), high blood pressure, advanced glycation end product formation (which increases inflammatory processes, arterial stiffness...), cytokines (such as IL-1, IL-6, IL-18 and TNF- α), smoking habits and genetic factors.

Such factors will damage the kidney's glomerular filtration barrier, responsible for the filtration of water and small molecules from the blood onto Bowman's capsule. The damage declines glomerular filtration, which leads to proteinuria (presence of proteins in the urine). The diagnosis is usually based on the measurement of high levels of albumin in the urine. It's considered normal a urinary albumin excretion inferior to 30mg/24h. If the albuminuria is between 30 to 299 mg/24h, it's considered microalbuminuria, which might be an indicator of the condition. When the albuminuria exceeds 300 mg/24h, it's already a clinical case, in need of treatment.

The most common treatment to this condition is the dialysis, a process to remove wasting substances and excessive water from the blood. Some methods include the peritoneal dialysis (that uses the persons' peritoneum to filtrate the blood) and the hemodialysis (where the blood is taken onto a dialyzer to be filtered, and then returns do the circulation).

These treatments might restrict the patients' lifestyle. Physiotherapists act to prevent their functional deterioration and help reducing the fatigue, pain, and discomfort that might come with the treatment.

Keywords: Diabetic nephropathy; glomerular filtration barrier; albuminuria; peritoneal dialysis; hemodialysis

HEMOPHILIA

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Hemophilia is a severe hereditary disorder of blood clotting and recessive genetic disease linked to the X chromosome. As such, it manifests itself mostly in men. Because women have two X chromosome, both of them have to be defected for women to have the disease. Most commonly, women only carry the hemophilia gene.

Hemophilia can be classified as A (factor VIII deficiency) or B (factor IX deficiency). Hemophilia A is more common than hemophilia B, accounting for 80-85% of the total hemophilia population. Both types of hemophilia have the same symptoms (large bruises, bleeding in muscles and joints, spontaneous bleeding and prolonged bleeding). The more reduced the factor activity is, the more severe is the hemophilia.

To stop bleeding, vasoconstriction and formation of platelet clot initially occurs, and subsequently the coagulation cascade. The coagulation cascade is composed of two pathways, the intrinsic pathway (activated by collagen) and the extrinsic pathway (activated by factor III). The purpose of this mechanism is to form a fibrin clot so that the bleeding can be stopped. The coagulation cascade is composed of thirteen factors and hemophilia results from the deficiency of factors VIII e IX, so the fibrin clot does not form and bleeding continues.

The main treatment for hemophilia is called replacement therapy. In this treatment, concentrations of clotting factor VIII, for hemophilia A, or coagulation factor IX, for hemophilia B, are slowly injected into the patient. These infusions help to replace the coagulation factor that is low or absent.

Keywords: Bleeding, hereditary disorder, coagulation cascade, blood clotting

WESTERN BLOTTING

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The proteins perform different functions in the organism and are responsible for their homeostasis. Changes in their composition may cause pathologies, so it's important the application of molecular methods for the identification of disease biomarkers.

In the 70's, Western Blotting, also named protein immunoblot, made possible that separated proteins by electrophoresis were detected, characterized and quantified. This technique is used to identify proteins from a sample of a biofluid, cell lysate or tissue. It is also used to confirm immunoenzymatic tests, such as detecting proteins of antibodies from HIV virus and others.

Western blotting is a method of high sensitivity and specificity, being applied in research laboratories and in the service of diagnostic routine.

The steps to elaborate this technique are five: preparation of the sample (e.g. protein extraction), quantification of proteins, separation of the proteins from a sample (electrophoresis on SDS-PAGE gel), transferring of the proteins to a membrane (blotting) and the incubation of the membrane with an antibody to detect the specific protein to be analyzed (immunodetection).

Keywords: Western blotting, immunoblot, electrophoresis, immunodetection

MASS SPECTROMETRY

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Mass spectrometry (MS) is an analytical technique that allows the molecular or atomic detection, quantification and characterization of a sample. This method consists on an ionization of the compounds, which leads to formation of free ions, that suffer a separation according to a mass / charge ratio. Later they are detected and quantified based on the ratio and their abundance. It is a method with a high degree of sensitivity and can be used with a small amount of sample. MS is applied in areas like clinical analysis such as drug screening, forensic and pharmaceutical sciences, determination of water or soils contamination and alimentary industry. Currently, this technique is used in combination with others, such as gas / liquid chromatography or capillary electrophoresis. This technique is used in the analysis of proteins, peptides and oligonucleotides, haemoglobin, drug testing, neonatal screening and also on pharmaceutical industry. Chromatography combined with MS gives highly selective and sensitive analyses and permits obtaining structural information about the analytes, this analytical technique is very efficient when used to detect substances at trace levels in complex matrices.

Keywords: Mass spectrometry, mass/charge ratio, cromatography, ionization

PRINCIPLES AND APPLICATIONS OF ULTRAVIOLET-VISIBLE SPECTROPHOTOMETRY

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Ultraviolet (UV) – Visible (Vis) molecular absorption spectrophotometry is an analytic procedure where it is possible to determinate the concentrations of samples through their interaction with energy. When these interactions occur, the samples absorb specific wave-lengths. This absorbance depends on the nature of the substance, its concentration and the thickness of the cell, which is intersected by radiation. This technique is based on the Lambert-Beer's law which correlates said variables ($A = -\log(T) = \epsilon bC$), when the molar extinction coefficient (ϵ) and the path length of sample (b) are constant, it is ascertained a direct proportionality between absorbance and analyte concentration. Spectrophotometry is widely used in biochemical laboratory tests allowing to achieve a certain scientific result or diagnosis.

Quantitative determinations are made due to this procedure's sensitivity and high degree of precision and accuracy, as in analyses of glucose, total lipids, total cholesterol, total proteins by Biuret method, serum albumin by Bromocresol method, creatinine by the Jaffé method, urea, aminotransferases and bilirubin.

Keywords: Spectrophotometry; Lambert-Beer's law; UV-Vis spectrophotometry; biochemical laboratory tests.

IMMUNOLOGICAL METHODS: FLOW CYTOMETRY

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The immunological methods are meant to isolate and study different cell types that make up the immune system. Flow cytometry is one of the most advanced methods used in biomedical research, diagnosis and monitoring of various immunological diseases due to the fact that it's both very sensible and sensitive. It consists of an analytical technology that uses the principle of light dispersion and fluorescence emission of conjugated fluorochromes with specific molecules to identify, analyze and / or purify cell populations as well as fragments of these or smaller particles. There are two types of cytometers: Analytics or Analyzers and Separators or Sorters. It has its main applications in the branches of Molecular Biology, Hemato-oncology, Immunology, Biochemistry, Pharmaceutical Sciences, Microbiology and Genetics. It's possible to evaluate parameters such as FSC (Forward Scatter) that matches the cell size as well as SSC (Side Scatter Characteristics) which is granularity / cellular complexity. These parameters allow to identify different populations of cells, namely leukocytes isolated from the blood since they present a set of markers specific to each cell type. Immunophenotyping and minimal residual disease screening are some of the specific applications of flow cytometry.

Keywords: Flow cytometry, dynamic light dispersion, fluorochromes

NUCLEAR MAGNETIC RESONANCE

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Nuclear Magnetic Resonance (NMR) is a phenomenon whereby a nucleus absorbs electromagnetic radiation of a specific frequency in the presence of a strong magnetic field. When the nucleus is submitted to it causes two different spin states: one, aligned with the field (low energy) and the other, in the opposite direction, (high energy). By submitting certain atomic nuclei to the action of a magnetic field with a frequency corresponding to the energy difference between the two spin states, the energy is absorbed by the system and the nuclei with low energy levels move to the higher levels. These transitions can be detected by an equipment of NMR spectroscopy, allowing the detailed acknowledgement of the structure, of the dynamics and of the state of reaction of the chemical compounds.

Of all the applications in which NMR is relevant, such as structural biology, study of mobility and flexibility of molecules, among others, it is of interest to emphasize its importance in the clinical identification of several neoplasms since it identifies malignant markers, as well as in identifying other diseases.

The study of brain neoplasms in NMR is based on the resonance frequency to obtain structural information on the metabolites and on detecting changes in the chemical signals of them to identify cell activity and other tissue properties.

NMR is also an important tool in metabolomics analysis, namely in biomarkers discovery in biofluids, allowing the diagnosis and prognosis of a lot of diseases such as type 1 diabetes, pancreatitis and various neoplasms.

Keywords: Nuclear magnetic resonance; neoplasms; metabolomics; metabolites

INDIRECT ELISA: GREATER ACURITY AND RELIABILITY IN THE RESULTS.

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Indirect ELISA is a test that uses a solid support that contains attached antigens that are put in contact with the patient samples to find if exist antibodies against that antigens and if exist it's changes color .This test is used to detect the presence of antibodies and it's one of the methods used to give a serological diagnosis of infectious-contagious (ex HIV) where the detection of antibodies IgG and IgE it's significant.

It is important to eliminate a variety of false positives as well as false negatives that may be associated with the onset of serum antibodies by the use of indirect ELISA. These reactions can be caused by buffer components; noise reactions caused by the hydrophobic binding of immunoglobulin compounds present in the samples; false positive reactions caused by nonspecific binding of immunoglobulins to target antigens by protein - protein interactions.

There is no blocking agent that can prevent false positive and negative reactions, and antibody test results vary depending on the buffer used. In order to combat these problems, a pretreatment was performed for all types of non-specific reactions in the indirect ELISA method, as well as the efficacy of the presently used buffers.

To obtain precision and reliability of the results obtained in the assays, they were examined promisingly by inhibition tests with individual buffers. Based on the study presented, a definitive ELISA protocol was provided to improve the technique and thus obtain accurate, reliable, and reproducible assay data against a variety of antigens.

Keywords: Indirect ELISA; antibodies; antigens; protein interactions

SODIUM DODECYL SULFATE POLYACRYLAMIDE GEL ELECTROPHORESIS

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Electrophoresis is a technique which separates molecules by the application of an electric field. In a protein solution, these molecules migrate in a direction at a rate that reflects their molecular mass and electric charge.

In the polyacrylamide gel electrophoresis (PAGE) the Sodium dodecyl sulfate (SDS) detergent is added to the samples to be separated, so this technique is known by SDS-PAGE.

The electrophoresis consists of three phases, the first is the the separation of the different protein fractions (electrophoretic separation); the second is the development stage, which involves staining and washing of the support media; and the third refers to the quantitative reading of the different fractions.

With this technique, the samples are denatured by heat in the presence of the SDS detergent. The SDS surrounds the protein chains covering the proteins with negative charges. In this way, the intrinsic charge of the protein is "masked" by the detergent, making the ratio charge / mass constant, enabling the separation, separated as a function of their size.

The doctors may order an SDS-PAGE electrophoresis to help diagnose or monitor some diseases or disorders that are related to proteins or abnormal levels of proteins. Normally it is not used alone to diagnose a disease, but rather as a complementary test of other tests, helping then in the diagnosis of Multiple Myeloma, multiple sclerosis, among other pathologies.

Keywords: Electrophoresis; proteins; sodium dodecyl sulfate; polyacrylamide gel;

NEPHELOMETRY

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Nephelometry is a quantitative immunologic method used to analyze different parameters in fluids such as plasma, serum, cerebrospinal fluid and urine.

This method can be used to detect either antigen or antibody, but it usually uses the antibody as the reagent and the patient antigen as the analyte. In Immunology there are two types of tests that can be performed: end point nephelometry and kinetic(rate) nephelometry.

It is used to measure the level of immunoglobulins that are present in our blood, more specifically the proteins IgM, IgG and IgA, it quantifies drugs, plasma and serum proteins (such as C-reactive protein, ferritin, transferrin, C3 and C4) concentrations, and also urine's bacterial contamination, and air and water pollution levels. This quantification is important for disease classification and it's monitoring once a patient has been treated.

Nephelometry is performed by a device that measures the turbidity of a sample, passing a light through it, at a certain angle. This measurement consists in determining the amount of light scattered, after it passes through the sample, and it's comparison with the amount of scatter from known mixtures. The amount of the analyte is determined from a standard curve.

This technique is widely used in clinical laboratories because it is easily automated.

This work presents the method, it's advantages, disadvantages, applications and a study about serum immunoglobulin concentrations in healthy children to enhance the importance of the nephelometry technic in diagnosing immunologic diseases, and the influence of genetic and enviromental factors in serum imunoglobulin concentrations.

Keywords: Nephelometry, immunoglobulin concentration, immunologic disease,

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CAPILLARY ELECTROPHORESIS

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Capillary Electrophoresis (CE) is a very sensitive and of high efficiency analytic technique that separates distinct molecules based on their different mobility, in an electrolyte solution, under the influence of a certain electrical field. Numerous authors claim that this is the most effective technique among separation techniques.

In order to understand this technique it's extremely important to have knowledges about electrophoretic mobility and electroosmotic flow, which is the flow generated in CE.

It is very important to acknowledge the CE advantages, from the easy handling and configuration of the equipment to the accuracy and precision of the obtained data.

Is also important to talk about the CE's value in the Human Genome Project, in which the scientists managed to map all the human genome and identify all the nucleotides that it may consist in.

Therefore, besides being able to separate electrical charged macromolecules it is also a very versatile technique which allows it to be of great use in several areas such as biological research. Which includes DNA sequencing for genetic researches, and Screening for Loss of Heterozygosity in Tumor Samples.

Keywords: molecules, mobility, electrical field, human genome,

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LIQUID CHROMATOGRAPHY

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Chromatography is a quantitative technique that separates components of a mixture with differential affinity components for the mobile phase and the stationary phase. The diversity of mobile phases and stationary phases makes chromatography a very powerful technique.

Being that within the chromatography there are varied techniques, such as liquid chromatography in column. In this separation technique the stationary phase is carried out within a column which may contain a solid or liquid filler, while the mobile phase is liquid.

In liquid chromatography we have high performance liquid chromatography (HPLC), which is a type of chromatography that uses a mobile liquid phase and a stationary phase formed by particles of reduced diameter. Clinically, HPLC can be used to quantify the most varied substances in human plasma, both at the pharmacological level and in the application of the analysis performed in the areas of biochemistry and immunology in the diagnosis and monitoring of various pathologies. In clinical analysis HPLC is used in the detection of metabolites, proteins, peptides, amino acids, etc. As an example we have the determination of 25-Hydroxy-vitamin D, glycated hemoglobin, steroid hormones, among others.

Keywords: HPLC, LC, 25-Hydroxy-vitamin D, glycated hemoglobin

FALSIFICATION/COUNTERFEITING OF MEDICINES

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BACKGROUND: The falsification and counterfeiting of medicines is becoming a bigger problem, a problem everyone should start focusing on, so we can fight to stop it. These activities appear due to the inequality in wealth distribution. The counterfeiting of medicines consist on the falsification of products, violating copyright.

AIM: Throughout this work, we are going to talk about the main reasons for the execution of this procedure.

MATERIAL & METHODS: In order to make this work, Google Scholar's database was used, where the terms of selection were: the title of the thesis and its abstract, gathering five of them that were created in 2011-2015.

RESULTS: In all the articles there is a consensus saying the most counterfeit medicines are erectile dysfunction, weight loss, cardiovascular diseases, oncological, antibiotics, antiretroviral and antimalaric.

There was a distinction of counterfeit medicines between developed and underdeveloped countries, and that is the type of medicine forged.

Studies concluded that, in 2010 the sells of counterfeit drugs reached the 50.6 millions of euros, 95% of the profit made in 2005.

We also learned that Asia is the continent where counterfeiting exists the most, followed by America and then Europe. And we also observed that this group of medicine belongs to about 10% of the world's pharmaceutical market

CONCLUSION: By making this monograph it was possible for us to see that even with all the efforts that have been done by various entities there is still a lot of counterfeiting, which needs to be extinct to stop putting population in danger.

Keywords: Counterfeiting of medicines, falsification of medicines, medicines, pharmaceutical market

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MEDICATION RECONCILIATION

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BACKGROUND: Medication reconciliation includes the collection of an updated medication list from the patient. That information is used when prescribing medications, comparing the new orders against the original list to make sure that all of the correct prescriptions are ordered or held as appropriate. This process includes three phases: patient's therapeutic evaluation, identification of variation and adjustment of medication errors.

AIM: To gather information regarding errors of medication reconciliation.

MATERIAL & METHODS: Our project is based in three articles found on b-on and PubMed platforms, which are comprised from 2006 to 2015.

RESULTS: A majority of errors related to reconciliation result of discontinuation and omission of medication; failure when it comes to resolve discrepancies in doses and drug interaction. For example, a patient presented to the hospital with a handwritten list of medications that was used to create a current medication profile. The doctor misunderstood Desogen and prescribed a dose of Digoxin with a different posology.

CONCLUSION: This process helps to avoid discrepancies, such as omission, duplication or inadequate doses and patient harm. Inadequate communication, documentation and bad teamwork are causes for medication errors.

One solution proposed to decrease reconciliation errors at care transitions is to improve a unified healthcare records system with standardized data on all medications prescribed for an individual by all healthcare professionals at any care level.

In the future, there is hope that hospitals will implement a process for obtaining and documenting a complete list of the patient's current medications upon their admission/entry.

Keywords: Medication Reconciliation; Medication Errors; Patient Safety; Medication Prescription

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ETHICS AND PEDIATRIC CLINICAL RESEARCH

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BACKGROUND: Clinical trial is any investigation in human subjects intended to discover or verify the clinical, pharmacological or other pharmacodynamics effects of one or more investigational medicinal product, or to identify undesirable effects, and to analyze the absorption, distribution, metabolism and elimination of experienced drugs in order to determine the respective safety and efficacy.

AIM: This review aims to approach the trials and research ethics with special attention to the pediatric population.

MATERIAL & METHODS : For this review, we used articles published in the database "Google Scholar" and has been used 5 articles with publication of intervals between 2013 and 2016 were also used data from the Ethics Committee for Research Clinic and some Decrees law.

RESULTS: Any adult who uses a drug has a guarantee that it meets rigorous standards of effectiveness, safety and quality. Reality that has not been verified for the pediatric population.

Data published in 2008 by the FDA estimates that 50-75% of the medicines used for the pediatric population have not been tested to the same population, which is not unlike the European Union with 50-90%. The reason for such an event can be explained by economic, equipment and experts and even the ethics of clinical research.

CONCLUSION: Despite the increasing developments in this area, the issue of pediatric clinical trials is still a dilemma, for it is necessary in the same time stressing the importance of the same practice and research ethics.

Keywords: Clinical trial; Pediatric population; ethics

PREVENTION AND CONTROL OF INFECTIONS AND ANTIMICROBIAL RESISTANCE

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BACKGROUND: The appearance of infections is almost inevitable at the health care institutions, making it difficult to properly treat the patients and increasing the consumption of hospital and community resources. The control of infections associated with health care is closely related to the prevention of antimicrobial resistance, because they facilitate the treatment of infected patients, but simultaneously promote the emergence of more resistant bacteria.

AIM: Gather of information regarding infections and antimicrobial resistance at the hospital environment.

MATERIAL & METHODS: In the elaboration of this review were chosen 8 articles of which we only used 5 (2004-2015), with an application of a methodology by analysis of title and abstract in the search engines: Google, sciELO and PubMed. We defined our age group since 65 years old, according to the world age pyramid.

RESULTS: Was observed the incidence and prevalence rates of infections and some bacterias at the hospital environment. According to the World Health Organization (WHO) the infections are responsible for 25% of death in the world and 45% in the least developed countries (WANNMACHER, 2004). In 2014, Portugal took the 16^o place in an european ranking and situated below the average of the antibiotic consume.

CONCLUSION: To prevent and control this infection and resistances against antimicrobial is essential to promote, inform and educate about them. So we must alert to the adequate use of antibiotics to minimize the emergence of bacterias antibiotic-resistant and the correct use of the Hospital infection control measures.

Keywords: Hospital infection, antimicrobial resistance, control and prevention of the infections

ENSURING THE SYSTEMATIC PRACTICE OF INCIDENT NOTIFICATION, ANALYSIS AND PREVENTION

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BACKGROUND: In view of the fact that safety is considered as one of the fundamental elements of health quality, the World Health Organization and the European Commission recommend to Member States the development of safety incident reporting systems.

The reporting of security incidents is considered as one of the tools to identify the risks, hazards and vulnerabilities of an organization, being the one that best allows the sharing of learning with the error and the consequent implementation of improvement actions.

AIM: Emphasize the importance of notification in the analysis and subsequent prevention of incidents

MATERIAL & METHODS: Our article is based on search in National Health Service and in two Cohort articles related to the incidents and their notification, published between 2008 and 2014. We used the search engine google academic.

RESULTS: In our search we release that, in Portugal, 90% of the institutions providing health care implemented safe practices of medications and a reduction of 50% about the number of occurrences related with medication error.

England and Wales, between 1st August 2006 and 28th, there were submitted 12084 patient safety incidents, 2541 incidents identified as associated with medication use. In Canada, between January 1, 2007 and December 31, 2008, were reported 78 medication incidents.

CONCLUSION: Through the notification and analysis of incidents, healthcare practitioners can learn from reported incidents and implement system-based safeguards, preventing similar incidents from occurring in the future. This is why notification of incidents is so important to learn and prevent new ones.

Keywords: Patient Safety; Incident Reporting; Analysis; Prevention

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ORPHAN MEDICINE

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BACKGROUND: Orphan medicine is a statute awarded by an official health regulator, to medicines that treat rare diseases. These diseases affect a small number of individuals, compared to the general population, occurring infrequently or rarely. Drugs nicknamed orphans are thus designated, since under normal market conditions there is no interest in developing them, due to the low financial return caused by their rarity.

AIM: Gather information regarding orphan drugs and their current importance and legislation at an European and national level

MATERIAL & METHODS: Our article was based on several articles taken from Google Scholar and PubMed. The publishing dates range from 2011 to 2017.

RESULTS: In the European Union, a disease is considered rare when it affects less than 5 in 10,000 people. Legislation and funding Research and development projects aim to promote the development of orphan medicinal products. The one hundred and fourteen orphan medicinal products authorized by the European Commission currently cover 94 rare diseases, mostly oncological and metabolic diseases, representing the areas of greatest development and investment.

CONCLUSION: European legislation on orphan drugs has been successful in slowly increasing research, development and introduction of new orphan medicinal products on the market. In the future, an even greater investment on this research and with the establishment of a connection to industry will be an important way of attracting investors and creating therapeutic innovation, which will lead to a beneficial impact on the economy.

Keywords: Rare diseases, European legislation, orphan medicine

EXPENDITURE IN MEDICINES AND THEIR CONTROL

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All health systems are progressing in order to achieve three fundamental objectives: reduce costs, increase quality of care and improve accessibility. However it may be difficult to balance them.

In this work we aim to demonstrate the aggravating amounts of money spent on drugs annually and try to delimit some norms of control of these same ones. We based in three articles and four thesis to do his work.

Portugal was taking the first position on expenditure of medicines, and its rhythm of growth in total spending on health has been alarming in the last few years. This was caused due to several factors as: improvements registered at the scientific level, the important function of new technologies, aging population and highest requirement of all, but essentially of the agents involved in the execution of objectives and future guarantees of quality and longevity of life.

In Portugal, between 2000 and 2009, the expense increase in health was below OCDE average. In 2011, the results showed the same decrease trend, continuing to present a health spending in proportion to PIB over OCDE average. In Portugal, there was a decrease in health spending above the OCDE decrease. This takes to the necessity of creating wider policies which favor an accurate evaluation of the medicine value.

In conclusion, the "(...) simultaneous adoption of measures, in extent of drug policy, such as the adoption of a new model of medical prescription and the reduction of the number of prescription medicines (...) are factors that have ability to interfere with the pharmaceutical market (...) ". In brief, we were able to conclude that the financial situation experienced by our country, at the pharmaceutical level, can be reversible and changeable.

Keywords: Expenses, control, medicines, delivery and market.

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EQUITY AND ADEQUATE ACCESS TO HEALTHCARE

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BACKGROUND: The access to healthcare and equity are a fundamental aspect of society. Health care allows the population to reach its full potential, bearing in mind the socioeconomic contexts of the different social groups.

Equity, however, consists in the absence of systematic measures in one or more aspects of health among socially, geographically or demographically characterized population groups.

AIM: Understand the means by which equality can be guaranteed in terms of access to health care services.

MATERIAL & METHODS: To elaborate this review article, we used two articles by 'Plano Nacional de Saúde' and published in 2012 and 2015

RESULTS: The lack of equality is very noticeable and that measures must be taken to combat it.

CONCLUSION: We conclude that there should be a better match between health needs and the responses of the services as well as a better relationship between the resources available and the results obtained, so health gains can be more easily achieved.

It should point out, that access to healthcare means that quality, safe, necessary and timely care needs to be provided, at the technically appropriate location and at the right time.

Keywords: Healthcare, equity, promotion, citizens, rationalization, universal access.

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HAEMOVIGILANCE: WHY? WHEN? WHO?

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Blood transfusions are required when there's a massive blood loss and certain diseases that threaten the person's life. Might be the consequence of surgeries or serious injuries that destroy the red blood cells or when the bone marrow isn't able to produce enough blood.

Risky situations can happen in blood transfusions (recipient and donor) but also in transplants. These situations might lead to death which is why health professionals in charge with them have to be extremely careful when handling these cases and also to err can't be an option.

Haemovigilance is defined by an array of control measures that make up the blood transfusion chain not leaving aside the patient follow up. It's important to gather all the information possible on unpleasant events with the intent to prevent their occurrence. Associated with blood transfusions unexpected situations might happen and must be reported to the regulatory authority. An investigation must be conducted by the appropriate entities, which will be analysed by the hospital transfusion committee.

The immune system (IS) is meant to protect the organism against foreign agents that can cause infections. When the transplant happens the recipient's IS recognises the new organ or tissue as strange and tries to eliminate it.

To prevent rejection it's important to keep taking the medicines and continue with the follow up over the years to make sure the organ is still functional and also to help prevent other possible infections or diseases because the medicines help weaken the IS.

Keywords: blood transfusion, haemovigilance, rejection, transplants

DIAGNOSED OF COLD AUTOIMMUNE HEMOLYTIC ANEMIA

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The Autoimmune Hemolytic Anemia (AIHA) is caused by circulating autoantibodies directed against red blood cell (RBC) antigens (Ag), resulting in destruction via complement system or reticuloendothelial system.

AIHA can be classified based on its etiology and according to with the temperature reactivity of the antibodies (Ab) to RBC.

In cold AIHA, the autoantibodies feature great response at temperatures 4°C. There are two distinct clinical entities: cold agglutinin syndrome and paroxysmal cold hemoglobinuria.

Cold agglutinin disease is idiopathic or secondary form, essentially associated with lymphoproliferative disorders and viral infections. Autoantibodies involved are mainly the IgM class and the RBC Ag most common involved is the I/i system.

Paroxysmal cold hemoglobinuria is frequently associated with viral infections of upper air routes. The autoantibody associated is biphasic IgG type, known as Donath-Landsteiner Ab.

The diagnose is based on clinical and laboratory evidence of hemolytic anemia, through hematological analysis, biochemical studies, and the detection and the identification of auto-antibodies or complement fractions binded to RBC. These are detected manly through direct antiglobulin test (DAT), using polyclonal and monoclonal reagents (to C3 and/or IgM) respectively, performed at temperatures between 4 and 18°C. This test presents limited sensitivity, if DAT is negative in patients diagnosed with AIHA, other techniques can be used, such as flow cytometry as it is more sensitive. In paroxysmal cold hemoglobinuria is used the Donath-Landsteiner test which detects the presence of IgG biphasic, through the presence of hemolysis. Elution tests are also applied to define the Ab specificity.

Keywords: Autoimmune hemolytic anemia; cold agglutinin syndrome; paroxysmal cold hemoglobinuria; direct antiglobulin test; Donath-Landsteiner

INFORMATIC CROSSMATCH IN MEDICINE TRANSFUSION

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Crossmatch is a critical step in pre-transfusion compatibility testing, whose principle is to assess ABO and Rh (D) compatibility and screening for unexpected red blood cell (RBC) antibodies (Ab). Informatic crossmatch in medicine transfusion is a process used to ensure that blood released for transfusion is compatible with the intended recipient, this term refers to the issue of blood without direct serological crossmatching. This method can be used when at least two determinations of the recipient's ABO group have been realized, at least one on a current sample, and there are no unexpected Ab. This is a recent and computerised technique which implies multiple ways of control and validation, but it increases the efficiency and the precision of this method.

Keywords: Crossmatch; informatic crossmatch; electronic crossmatch; transfusion medicine.

RELEVANCE OF MOLECULAR BIOLOGY TESTS IN MEDICINE TRANSFUSION

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The blood group systems are characterised by the presence or absence of antigens (Ag) in the red blood cells (RBC) membrane. These Ag possess well-defined functional and polymorphic characteristics, and their diversity is gene level identified.

The knowledge of these RBC Ag is essential in medicine transfusion practice, since the development of antibodies against these Ag may become a clinical problem, due to hemolytic reactions, mainly in hemoglobinopathies carriers or other diseases that require periodic blood transfusions.

To prevent hemolytic reactions, the compatibility to the ABO system and to the D Ag from the Rh system are fundamental, although it is also desirable that other Ag are compatible.

For compatibility to be determined it is necessary to determine the RBC Ag, to which the current method most utilised is the hemagglutination, for it's good specificity and sensibility, low prices and execution viability.

Over the last few years, the genetic knowledge about the blood group polymorphisms allowed the development of new techniques for blood group genotyping, using molecular biology techniques (the polymerase chain reaction or PCR), which increase the transfusion safety and efficiency for politransfused patients, such as thalassemia and sickle-cell disease carriers.

Pcr is a method that amplifies, in short time and in vitro, a specific DNA or RNA strand. Therefore, blood group genes are more easily identified. The most used PCR's protocols in blood group Ag's determination are allele specific primers (AS-PCR) and Pcr followed by restriction enzymes fragments analysis (PCR-RFLP).

Keywords: Molecular biology, antigens, gene, medicine transfusion, genotyping

DIAGNOSE OF COLD AGGLUTININS IN AN MEDICINE TRANSFUSION LABORATORY

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The cold agglutinins test is performed to diagnose many diseases and infections. There are patients with agglutinins in circulation for several years, without any pathologic effect. However, if the patient needs a blood transfusion, the cryo agglutinins can initiate a fatal reaction.

For hemolytic anaemia diagnose it's used the cold agglutinins test. And based on the clinic or laboratory evidence and the auto-antibodies detection (specifically IgM), with the human antiglobulin test (DAT, C3 positive) in presence of cold agglutinins in serum.

For DAT, it's needed a sample of blood coated in vivo and then washed to remove unbound globulins. Then we had the human antiglobulin promoting red blood cells (RBC) agglutination.

Autoimmune hemolytic anaemia due to cold agglutinins is a rare acquired pathology in which the involved antibodies are called cold agglutinins because they exhibit maximum activity at low temperatures (0-10°C) and cause agglutination of RBC.

Cold agglutinins, usually of the IgM class, combine with the antigen (Ag) on the surface of the red blood cells, forming an immune complex that activates the complement and causes hemolysis.

The Ag on the surface of the RBC with which they react are Ag I and i.

When the rate of destruction exceeds the bone marrow's recovery capacity, anaemia develops. Anaemia due to cold agglutinins may be idiopathic with symptoms and signs after exposure to cold or arises associated with other pathologies, such as Mycoplasma pneumonia infection, mononucleosis or lymphoproliferative diseases. Being more common in older people, by having a lower body temperature.

Keywords: Cold agglutinins test, direct antiglobulin test, aneamia, blood

DIAGNOSED OF HEMOLYTIC DISEASE OF THE FETUS AND NEWBORN

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Blood type differs according to the antigens (Ag) present on the surface of red blood cells(RBC), so our immune system recognises them as “self”. During our lives we produce antibodies (Ab) against other blood types, because, according to the Landsteiner rule, we only produce Ab against the Ag’s that we don’t have. The introduction of another blood type (for which we had Ab produced against), our immune system will recognise it has “not self” and will destroy the foreign cells, which may lead to anemia and in extreme situations to the individual's death.

This situation might happen during pregnancy which may lead to hemolytic disease of the fetus and the newborn (HDFN), the mother's antibodies (IgG) cross the placenta and enter the fetu’s circulation, by targeting fetal RBCs. A major cause of HDFN is the incompatibility of the Rh blood group between mother and fetus.

In advance we can verify the parents’s blood types to prevent and diagnose the HDFN. We can also diagnose HDFN using both direct and indirect human antiglobulin test, hemogram, search of high levels of bilirubin in the newborn’s blood. This is important to prevent abortion, asymptomatic mild anaemia to hydrops fetal or stillbirth associated with severe anaemia and jaundice.

Keywords: Hemolytic disease of the fetus and newborn, direct antiglobulin test, indirect antiglobulin test, antibodies, antigens

DIAGNOSED OF WARM AUTOIMMUNE HEMOLYTIC ANEMIA

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The Autoimmune Hemolytic Anemia (AIHA) is a clinical condition characterized by the premature destruction of red blood cells (RBC) due to fixation of immunoglobulins and / or complement on the RBC membrane surface.

In warm AIHA, the most common type, autoantibodies react at body temperature (37 ° C), where IgG causes extravascular hemolysis of RBCs. Etiologically they may be idiopathic or secondary, the last one associated with lymphoproliferative diseases, cancer, myelodysplasias, among others.

For warm AIHA diagnosis serological tests should be used such as the blood cell count where a decrease in haemoglobin levels, a marked increase in reticulocytes and spherocytosis can be demonstrated. Concerning biochemical tests, we can measure the elevation of indirect bilirubin, lactate dehydrogenase, decrease in haptoglobin, catabolization of free haemoglobin in plasma and hemoglobinemia.

To support these tests we have the direct antiglobulin test (DAT) where the presence of antibodies on the surface of RBC in vivo is demonstrated. DAT is positive when there is presence of IgG / complement on the surface of erythrocytes. If the amount of IgG is greater than 200 molecules per RBC, there is the possibility of AIHA, we can use higher sensitivity tests such as flow cytometry or the immuno-enzymatic test.

The diagnosis of warm AIHA can present the following symptoms like anemia, dizziness, fever, or dyspnoea.

Keywords: Antibodies; autoimmune hemolytic anemia; hemolysis; direct antiglobulin test; diagnosis.

DIAGNOSED OF DRUG-INDUCED AUTOIMMUNE HEMOLYTIC ANEMIA

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Drug-induced autoimmune hemolytic anaemia (AIHA) is due to the interaction of drugs on a red blood cell (RBC) membrane, changing it and making foreign the cell's natural antigens (Ag) to the organism.

Some of the techniques used in the diagnosis are peripheral blood studies of AIHA by cold and hot antibodies, flow cytometry, immunohistological studies, biochemical tests, among others.

Detecting antibodies in cold/hot is highly important to obtain conclusive results in the Direct Antiglobulin Test (DAT), that way we know which conditions are the best to do it.

A positive DAT implies that the RBC are sensitive to the antibodies and/or to the complement, confirming the presence of the disease. However, using the Indirect Antiglobulin Test (IAT) is inconclusive because the RBC receptors are depleted. Therefore, this technique is not used as complementary to the previous one.

To obtain better results and a more conclusive analysis we use the centrifugation, that by using fluorochrome markers, we analyze which antigens and antibodies are on the RBC's membrane. As well, intravascular and extravascular hemolysis, the indirect increase of bilirubin, lactate dehydrogenase increase and decrease of the serum haptoglobin levels help us confirm the diagnosis.

Keywords: Anaemia, Hemolytic, autoimmune; erythrocytes; cell membrane; self-tolerance; diagnosis.

RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM AND INHIBITORS OF ACE AND AT1 RECEPTORS

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The Renin-Angiotensin-Aldosterone System (RAAS) regulates blood pressure and electrolyte homeostasis. It has a relevant role in the pathophysiology of hypertension, renal and cardiovascular diseases.

ACE is an enzyme that converts angiotensin I (A.I) in angiotensin II (A.II). Angiotensin II causes blood vessels to contract, increasing blood pressure. ACE inhibitors stop this conversion and as a consequence the blood vessels relax and the heart doesn't work as hard to pump blood through the body.

There is an interrelation between the RAAS and SPN (Natriuretic Peptide System) in the regulation of renal, vascular and cardiac functions controlled by two enzymes: endopeptidase and ACE, which regulate both PNS and RAAS.

Renal juxtaglomerular cells control renin secretion mainly by three paths: two of them with renal action, the other by the central nervous system. It can also be controlled by AII levels, through negative feedback. The use of ACE inhibitors and A.II AT1 receptors's antagonists increases the amount of renin.

The RAAS can be blocked in different places and by various mechanisms. The ACE inhibitor agents interfere in the conversion of A.I into A.II. The last is considered a systemic hormone which includes noradrenaline and vasopressin.

The aldosterone is related with the increase of blood pressure, cardiac hypertrophy, cardiac/vascular fibrosis and ventricular arrhythmics. A.II receptors blockers are pharmaceuticals that perform in the AT1 receptors, responsible for vasopressin, release of aldosterone and myocardium and vascular effects.

This way, the ACE inhibitors are effective in the decrease of blood pressure. When associated with diuretic the efficiency is increased.

Keywords: Renin-Angiotensin-Aldosterone System, renin, angiotensin

ORAL ANTIDIABETICS

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Oral antidiabetics are drugs used to control type 2 diabetes, these are grouped into 6 classes by the mechanism of action.

Metformin of the class of biguanides, is the first line drug in obese patients. They appear to work reducing gluconeogenesis in the liver, in addition to decreased glucose uptake in the gastrointestinal tract and increased insulin sensitivity, due to the increased use of glucose and fatty acids by muscles.

Sulfonylureas - 1st option in non-obese individuals. They act by closing the potassium channels, promoting the depolarization of the beta cells of the pancreas, with these channels closed the amount of calcium inside the cell increase, which potentiates the exocytosis of insulin and the C peptide.

Glinids family are similar to sulfonylureas, but much faster, prescribed for pre-meal intakes.

Glitazones, improve the sensitivity of white tissues to insulin by acting on the activation of the nuclear receptors of the class PPAR- γ , which control intra-cellular mechanisms as varied as cell differentiation.

α -glucosidase inhibitors like acarbose act by delay the digestion and absorption of carbohydrates, which leads to a decrease in glucose absorption.

Gliptins- inhibit DPP-4 and the "incretin effect" occurs due to the release of hormones that potentiate glucose-dependent insulin secretion in the intestinal tract, GIP and GLP-1.

Given the side effects of current therapy, the new generation of drugs - the inhibitors of the SGLT2 seems to be a promising solution. They act by inhibiting reabsorption from the kidney independently of insulin or beta cells, thereby reducing blood glucose levels.

Keywords: Oral Antidiabetics, drugs, type 2 diabetes, insulin.

BIOLOGY OF THE HIV-AIDS VIRUS– ANTIRETROVIRALS

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The HIV virus is known as a retrovirus belonging to the Retroviridae family and Lentivirus genus. A retrovirus is characterized by having in its genome RNA.

This virus originates the acquired immunodeficiency syndrome (AIDS), because it attacks the T lymphocytes making our immune system unprotected against diseases and infections and unable to respond.

In addition to attacking the cells, HIV multiplies fast when inside them, causing their death, because the cells after having the virus inside them begin to express in their membrane proteins of the same, no longer being recognized by our immune system.

There is still no cure for the disease caused by this virus, but antiretroviral drugs are used as therapy to reduce the amount of virus and delay its evolution restoring as much as possible immunity, improving the patient's quality of life. There are three different classes in this type of drug: reverse transcriptase inhibitors that prevent the virus from turning RNA into DNA, a step necessary for multiplication within the cell; Protease inhibitors, which block copies of the virus from infecting other T cells and fusion inhibitors, which prevent binding between the virus and the lymphocyte.

These drugs can be taken either in the symptomatic phase or in the acute phase, but their administration must be strict because if not done correctly, the virus can destroy the lymphocytes and become resistant to the drugs.

Keywords: Virus, retrovirus, T lymphocytes, antiretroviral drugs

ANTI-HISTAMINES

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Antihistamines are a class of drugs that are used to provide symptomatic relief from allergic reactions. They can be administered in different forms, such as: pills, capsules, liquids, nasal sprays and eye drops. Antihistamines antagonize (inhibit) the effects of histamine either by blocking its binding to H1 receptors or by inhibiting the enzymatic activity of histidine decarboxylase (an enzyme that catalyses the transformation of histidine into histamine).

Histamine is responsible for the inflammatory response and is synthesized by basophils, mast cells, platelets, histaminergic neurons and enterochromaffin cells, although the mast cells and basophils represent the most relevant source of histamine in the immune system. When the immune system detects a foreign substance, the mast cells release histamine that binds to receptors from another cells. This answer causes an increase of permeability of blood vessels in the area, this could lead to redness, swelling and itching – symptoms to an allergic reaction from an increase of histamine. Antihistamines are used to reduce these symptoms.

Antihistamines can be classified in three groups: the 1st-, 2nd- and 3rd-generation antihistamines. The first-generation show various side-effects, such as, drowsiness, anxiety, nausea, blurred vision, incoordination and tremor, owing to their lack of selectivity for the H1 receptor. They are still used widely owing to their efficacy and low cost (e.g. hydroxyzine). The second-generation are much more selective for H1 receptor. They are less selective for the central nervous system H1, reducing in this way their sedative side effects (e.g. cetirizine). Third- generations are metabolic products of second-generation.

Keywords: Histamine, H1 receptor, First-generation, Second-generation, Third-generation

METABOLISM OF CHOLESTEROL AND STATINS

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Cholesterol is a lipid that can be produced by the body or obtained by food consumption, and is necessary for the proper functioning of the body, being present in the membranes of all cells of the body.

Cholesterol is carried in the blood by lipoproteins and can be of two main types: LDL (bad cholesterol) carries cholesterol from the liver to the cells of the tissues and favors their accumulation in the internal walls of the arteries, decreasing blood flow, being directly related to heart disease; HDL (good cholesterol) takes the cholesterol deposited on the walls of the arteries back to the liver, where it is processed and eliminated, thus preventing the accumulation of cholesterol in the blood vessels.

The formation of cholesterol has four phases. Initially, acetyl-coA converts into mevalonate, then two acetyl-CoA molecules condense by the action of the thiolase enzyme to form acetoacetyl-coA, which condenses with a third molecule of acetyl-CoA to form HMG-CoA, reaction catalyzed by HMG-CoA synthetase. HMG-CoA is then reduced to mevalonate by HMG-CoA reductase. After several reactions, cholesterol is formed. Statins have a steroid structure and competitively inhibit the HMG-CoA reductase, an enzyme responsible for the formation of cholesterol in the liver, due to their similar structure to HMG-Coa they fit into the enzyme's active site. Given its importance if it can't function as it should, LDL production is delayed, which leads to an increase in HDL. Most commonly used are Sinvastatin, Atorvastatin (permanent HMG-Coa inhibition) and Lovastatin.

Keywords: Cholesterol, Statins, HDL, LDL

ANTICOAGULANTS AND ANTIAGGREGANTS

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Coagulation consists of forming, through a fibrin network, a blood clot which is essential to heal wounds and stop the bleeding. But there are situations in which they can block the blood circulation, and it can cause deep venous thrombosis, stroke or even infarction.

The endothelium contains collagen. When there is a wound and collagen is exposed, the platelets are activated to form a plug which sometimes is insufficient but it initiates the coagulation cascade to form fibrin strands, which strengthen the platelet plug. The coagulation cascade has two initial pathways which lead to fibrin formation. These are the contact activation pathway (intrinsic pathway), and the tissue factor pathway (extrinsic pathway) which both lead to the same fundamental reactions that produce fibrin.

To prevent undesirable coagulation, there are anticoagulant and antiaggregant agents.

Examples of anticoagulants are antithrombin, heparin and prostacyclin, taken through parenteral route, and through oral, warfarin. Antithrombin slowly inactivates thrombin. Heparin inhibits coagulation and activates antithrombin III, a natural inhibitor that inactivates factor X and thrombin. Prostacyclin neutralizes the effects of thrombin, causing vasodilation and preventing a release of coagulation factors from platelets. Warfarin prevents a reduction of vitamin K and consequently inhibits α -carboxylation of glutamic acid in coagulation factors II, VII, IX and X.

Examples of antiaggregant agents are aspirin and dipyridamole. Aspirin inhibits COX-1 enzyme, decreasing the formation of thromboxanes A₂, endogenous mediators promoting platelet aggregation. Dipyridamole is a vasodilator that inhibits platelet function by inhibiting adenosine uptake and an activity of cGMP phosphodiesterase.

Keywords: Coagulation, fibrin formation, anticoagulants, antiaggregants

INCRETINS; INHIBITORS OF DPP4 – GLIPTINS – AND GLP-1 ANALOGUES

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Diabetes mellitus type 2 is characterized by the increase of glycemia (sugar in the blood). This increase is caused by problems in the production of insulin or with its effect on cells.

Incretins are a class of substances made by the pancreas and by the intestines. They regulate the metabolism of glucose, boosting the insulin secretion there by decreasing the glucose levels in blood (glucagon).

An example of incretin is the Glucagon-like peptide-1, GLP-1. It's a peptide anti-hyperglycemic which is secreted in the blood flow and takes an increase of the segregation of insulin and decrease of glucagon in the pancreas, slowing down the gastric emptying, decreasing the aliment ingestion improving the insulin sensibility.

Dipeptidyl peptidase 4 (DPP4), it's an enzyme that degrades incretins like GLP-1. By the degradation of this incretin, there is a consequence decreasing in the insulin secretion and the increasing of sugar in the blood.

The exenatide and the liraglutide are analog medicines of GLP-1, which have structural reassembles and mimic their action. By this structural reassembles this incretin acts similarly, but as they are synthesized they show themselves more resistant to the degradation by the DPP-4, allowing incretins to act more time.

The sitagliptin and the vildagliptin are DPP4 or gliptins inhibitors and as the name says, they inhibit DPP4 action

So for the glycemic control, anti hyperglycemic or hypoglycemic medicines are administrated witch increase the GLP-1 action or inhibit the DPP4 actuation.

Keywords: Incretins, Diabetes mellitus type 2, Glucagon-like peptide-1, Dipeptidyl peptidase 4

SGLT2 INHIBITORS

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SGLT2 is a protein (co transporter) of the apical membrane which is expressed in the proximale tubule, ATP dependent, that performs the reabsorption of glucose. It is used as a treatment for type 2 Diabetes Mellitus.

The inhibitors of the SGLT2, by stopping the actions of this protein, reduce the glucose in the plasma due to the increase of elimination of glucose via urine.

The glucose enters the cells of the proximale tubule via two types of transport proteins: GLUTS and SGLTS. The GLUTS transport the glucose through facilitated diffusion, while the SGLTS are sodium-glucose transporters against the gradient of glucose and for the sodium concentration. The sodium moves in favour of the electrochemical gradient and uses the SGLT2 to drag the glucose into the cell, against its own gradient. The glucose is diffused by the GLUT, while the sodium is pumped out by the sodium-potassium pump. The SGLT2 is responsible for 90% of the reabsorption of the glucose which is included in the straight proximale tubule by the SGLT1.

The reabsorption of the glucose is an active process mediated by the sodium, by the SGLT1 and by the SGLT2. The obstruction of SGLT2 leads to a high decrease in glucose reabsorption, even though Na⁺ is generating a force for such an occurrence, since SGLT2 reabsorbs 90% of glucose.

Initial studies led to the approval of three inhibitors (canagliflozine, dapagliflozin and empagliflozin) of the SGLT2, representing a major advance in the treatment of type 2 diabetes mellitus. We also add that currently only an SGLT2-Forxiga (dapagliflozin) inhibitor is marketed.

Keywords: Type 2 Diabetes Mellitus; Glucose; Inhibitors SGLT2; dapagliflozin

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TREATMENTS BASED ON SEXUAL HORMONES

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Estrogen is widely used in contraception and in hormonal therapy (HT). During menopause women start producing less amounts of estrogen so HT is prescribed to thousands of them to relieve the symptoms of menopause, such as sweating and mood swings. There are three kinds of HT, the first one where estrogen is the only hormone used, the combined continuous HT and cyclical HT. The various types of estrogens are equivalent in therapeutic efficacy. The maintenance of bone mass and a prevention of fractures are well established effects of estrogen. The dose must be personalized and at minimum effective.

Progestogens are used in the treatment of menstruation in perimenopause. The benefits are limited to the endometrial protection, for which they are effective and indispensable in the woman with uterus. Further studies on the potential risks and side effects of its use, namely at the cardiovascular and breast levels, are still needed.

Some progestogens with higher androgenic potency may attenuate the beneficial effects of estrogens on the lipid profile, as well as on the vessels. We should not give preference to these molecules in women with cardiovascular risk.

Keywords: Hormonal therapy, estrogen, progesterone

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AGES (ADVANCED GLYCATION END PRODUCTS) FROM FOOD. GLYCEMIC INDEX

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Advanced glycation end products (AGEs) constitute a class of heterogeneous molecules formed when proteins or fats combine with sugars (Maillard reactions).

The formation of AGEs is predominantly endogenous, but these products can be introduced into the body by exogenous sources such as food. A diet rich in highly processed foods, especially with high sugar content, leads to high exposure to AGEs. That is, foods with a higher glycemic index (higher amounts of glucose molecules) generate a higher production of AGEs.

The pathological effects of AGEs are related to the ability of these compounds to modify the chemical and functional properties of the most diverse biological structures, promoting oxidative stress, morphofunctional changes and increased expression of inflammatory mediators.

The removal of the AGEs formed in the tissue components is performed by cells such as macrophages, which endocytose AGEs releasing them into the bloodstream to be excreted in the urine.

Associated with these formation / absorption and degradation / elimination processes, the metabolism of AGEs in individuals can lead to the development of pathologies associated with these compounds, such as diabetes, atherosclerosis, arthritis, osteoporosis and Alzheimer's disease.

For example, in subjects with diabetes the serum concentrations of AGEs are significantly higher, since these individuals are under conditions of hyperglycemia (high concentration of glucose on blood).

Keywords: AGE's, diabetes, alimentação

THYROID DISEASES

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All functions and activities of our organism are coordinated and integrated by the nervous and endocrine systems. The thyroid is responsible for the production of three important hormones, triiodothyronine (T3), tetraiodothyronine or thyroxine (T4) and calcitonin, which have significant effects on the metabolism. Thyroid disorders are very common and tend mainly to occur in women, although anybody can be affected. The production and secretion of T3 and T4 hormones are regulated by a negative feedback mechanism. When something abnormal happens in this regulation some disturbances can appear, such as hypothyroidism, a common endocrine disorder resulting from lack of thyroid hormones, caused by iodine deficiency. Hypothyroidism can cause decreased metabolic activity (weight gain), low body temperature and cold intolerance. On the other hand, hyperthyroidism results from an increased level of thyroid hormones that can be caused by an autoimmune disease, which can increase metabolic activity. Hyperthyroidism might cause a high body temperature, heat intolerance and weight loss. The thyroiditis- inflammation of the thyroid gland, usually caused by an autoimmune attack or by a viral infection- might be associated with hypothyroidism as well as hyperthyroidism. Thyroid nodules are small tumors that can be solid or contain a liquid substance that may be cancerous. The thyroid cancer is uncommon, but there are four types: papillary, follicular, medullary and anaplastic.

Keywords: thyroid hormones;hyperthyroidism;hypothyroidism

NON-ALCOHOLIC FATTY LIVER DISEASE - NAFLD

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The liver plays a central role in lipid metabolism, importing serum free fatty acids and producing, storing and exporting lipids and lipoproteins. The non-alcoholic fatty liver disease (NAFLD) is a term used to describe an excessive accumulation of fat stored in liver cells of people who drink little or no alcohol.

This disease has several risk factors such as diabetes, obesity, dyslipidemia and also genetic predisposition. This pathology presents a prevalence of 30% in Portugal, and although in most cases NAFLD doesn't cause any problems, in others the long-term presence of this fat can lead to progressive nonalcoholic steatohepatitis (NASH), fibrosis, and ultimately hepatocellular carcinoma and liver failure. NAFLD disease carries an increased risk of death related to cardiovascular disease.

During the NASH, the excessive intake of free fatty acids (FFAs) in liver, causes an imbalance between oxidation and exportation of them, resulting in an accumulation of fat in the liver. Consequently, occurs the production of reactive oxygen species (ROS). Ultimately, cellular damage triggers a mixture of immune-mediated hepatocellular injury and both necrotic and apoptotic cell death pathways; once these persist, stellate cell activation and fibrogenesis ensue. NAFLD is usually asymptomatic, although fatigue and discomfort in the right upper quadrant of the abdomen may be reported.

The molecular mechanisms that combine to define the transition to NASH and progressive disease are complex, and consequently, no pharmacological therapy currently exists to treat NASH. It consists in lifestyle changes, including healthy diets and regular physical activity.

Keywords: esteatose hepática, cirrose, carcinoma hepatocelular, fibrose hepática

HORMONAL FUNCTION OF ADIPOSE TISSUE: ADIPOKINES

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The adipose tissue is an organ constituted by several components: adipocyte, matrix of connective tissue, nervous tissue and immune system cells, among others. This conformation allows the production of hormones in adipocyte, acting both, at local level (Paracrine/Autocrine) and systemic level (endocrine), named adipokines or adipocytokines. Adipokine receptors are found in many tissues, affecting several physiological functions in peripheral organs and in the central nervous system.

Leptin is an adipokine that promote the reduction of hunger, increase energy expenditure, plays in active role at metabolism of glucose and lipids and the neuroendocrine system regulation. Leptin secretion increases with fat mass being thereby increased in obese people. However, obesity is often characterized by the development of a resistance to this hormone as a result of receptors reduction.

Moreover, other active substances were identified: Adiponectin, resistin, TNF- α and interleukin-6.

Adiponectin plays a key role in increasing insulin sensitivity, improving anti-inflammatory action, inhibiting the growth of macrophages precursors, secretion and action of TNF- α and reducing hepatic lipid synthesis and gluconeogenesis. In contrast to leptin, body weight gain slows down significantly the concentration of adiponectin. Besides that, they have complementary effects in our organism.

Adipocytokines regulate several metabolic processes, such as the mechanism of hunger regulation, energy expenditure and the peripheral insulin sensitivity. Thus an irregular release of these proteins leads to changes in metabolism. This relationship can promote obesity-related disorders by inducing endothelial dysfunction, inflammation, atherosclerosis, type 2 diabetes mellitus and cancer.

Keywords: Adipokines, Hormonal function, Adipose tissue

BARIATRIC SURGERY

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High energy intake coupled with the sedentary lifestyle led the world to the epidemic of the century, obesity. This is characterized by an excessive accumulation of adipose tissue which, when chronic, affects quality of life, often due to the associated pathologies. In this cases, the patients will hardly respond to the most widely used therapeutic approaches, requiring a more effective intervention, the bariatric surgery.

Bariatric surgery consists of an invasive procedure that modifies the gastrointestinal tract. There are two types of bariatric surgery: restrictive and disabsorptive. The restrictive surgery decreases the capacity of the stomach by reducing the amount of food ingested (adjustable gastric band and vertical "Sleeve" gastrectomy). The disabsorptive surgery decreases the amount of nutrients absorbed, and we have as example the biliopancreatic diversion. There are also surgeries that combine the two types described, such as gastric bypass.

Most of the times, bariatric surgery results in weight loss and improvement of comorbidities, increasing quality of life. Despite the great effectiveness observed, there are some post-operative complications that implies an extensive nutritional, physical and psychological evaluation performed before the procedure. Post-operation is assured mainly at nutritional level with the prescription of healthy and appropriate diets.

This surgical treatment is effective, but it must be used as last resort and never as an aesthetic treatment. This is important because a balanced and healthy diet together with an active life style can prevent this morbidity.

Concluding, this worldwide epidemic is treatable, but most importantly should be prevented with a healthy life style.

Keywords: Bariatric surgery; sedentary lifestyle; obesity.

VITAMIN K AND COAGULATION

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Vitamin K is a lipophilic, hydrophobic vitamin, produced by the bacterial flora that may appear in the form of Phylloquinone, Menadione, Dihydrophyloquinone or Menaquinone. It can also be obtained through diet by ingesting dark green leafy vegetables. Its absorption occurs in the small intestine and its transport through the lymphatic pathways. This vitamin is involved in the regulation of 3 mechanisms: blood coagulation, bone metabolism and vascular biology. In the absence of vitamin K, protein factors are synthesized, but aren't functional.

In the process of blood coagulation, vitamin K acts as a co-factor for the carboxylation of glutamic acid's specific residues to form gamma carboxylglutamic acid. Glutamic acid is present in some of the coagulation factors such as Prothrombin and factors VII, IX and X, leading to the formation of Gla. This carboxylation reaction enables the coagulation proteins to bind to calcium, allowing interaction with the phospholipids of the platelet and endothelial cell membranes, enabling the blood coagulation process.

The coagulation cascade proceeds through two pathways. The intrinsic pathway is activated by exposure of collagen that activates factor XII, which in turn activates factor XI, which activates factor IX and factor X. The extrinsic pathway is activated by exposure of factor III that activates factor VII, that also activates the X factor. After activation of Factor X, it cleaves Prothrombin to Thrombin, which in turn cleaves Fibrinogen, forming the fibrin that constitutes the fibrin networks responsible for stabilizing the haemorrhage.

Keywords: coagulation vitamin k

INSULIN RESISTANCE MECHANISMS

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Insulin is a hormone produced in the pancreas and is intended to regulate glucose homeostasis in the blood. It is formed by the body during the ingestion of carbohydrates and allows the glucose to enter the cells, especially those of the adipose tissue and the muscles, but also regulating its storage in the liver, and then be transformed into energy. Insulin resistance is a complex metabolic disorder consisting of decreased glucose uptake by insulin-dependent tissues, that is, regular insulin levels are unable to produce normal responses from adipocytes, myocytes and hepatocytes. Obesity is directly linked to this problem. In this case, with increased weight and increased adipose tissue, the body will produce cytokines, triggering an inflammatory response, in order to prevent the emergence of more adipose tissue. This response, in turn, will initiate the mechanism of insulin resistance and thus, the hormone is no longer recognized by its receptors, not allowing glucose to enter insulin-dependent cells. As insulin does not bind to receptors, it continues to circulate in the bloodstream, causing excess insulin in the blood and consequently glucose, which can lead to type 2 diabetes. Physical exercise is fundamental because it increases insulin sensitivity and improves the uptake of glucose in target cells, especially in muscle cells. It is also advised to consume low-glycemic foods, which slowly supply sugar into the bloodstream.

Keywords: Insulin, Resistance, Obesity, Diabetes, Physical Exercise

SATIETY MECHANISMS

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Satiety is the sensation of fullness in regards to the need to eat.

One of the hormones present in this process is cholecystokinin, which is responsible for a signal of satiety when food passes from the stomach into the intestine, in response to the presence of proteins and fats in the food.

The peptide YY is an hormone whose function is to decrease the food intake of adiposity and the reduction of glycemic rates in individuals with diabetes, which induces the sensation of postprandial satiety.

Another hormone that acts in the control of satiety is the GLP- 1, which stimulates biosynthesis and insulin release, reduces gastric emptying, relaxes the bottom of the stomach, reduces the secretion of hydrochloric acid and generates the sensation of satiety, overcoming the bloodbrain barrier.

In the other hand the Leptin indicates the amount of body fat that moves into the blood flow and reaches the brain and inhibits the food ingestion. Another hormone also related to appetite control is ghrelin that induces appetite, control the energy balance, acid secretion, act on the endocrine function of the pancreas, glucose metabolism, cardioprotective and anti-neoplastic action, in other words, has the opposite effects as leptin.

The secretin is produced in response to a low PH and the presence of fatty acids which helps to neutralize the gastric acid who enters the duodenum through the stomach.

Lastly, the insulin goes through the blood into the extracellular fluid of the brain, binding into the nerve cells and transmitting a sign of satiety which informs the brain that it is time to stop eating.

Keywords: satiety mechanisms; hormones; satiety; anatomophysiology

BROWN ADIPOSE TISSUE

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The adipose organ is a complex endocrine organ, composed of white and brown fat. Brown adipose (BAT) is usually located in supraclavicular, neck and spine regions. This tissue stores little fat, burning it instead to produce heat and regulate body temperature, through energy expenditure in animals or newborns which don't tremble.

It's highly vascularized and innervated by the sympathetic nervous system and characterized by multilocular lipid droplets and abundant mitochondria expressing uncoupling protein-1 (UCP1), which gives the cell's mitochondria an ability to uncouple oxidative phosphorylation and utilize substrates to generate heat rather than ATP.

The exposure to cold leads to sympathetic stimulation of brown adipocytes via epinephrine binding to beta- adrenergic receptors. This process is part of what is called nonshivering thermogenesis, which doesn't exist without functional BAT. The main areas of progress in BAT research during the last decade have been the general acceptance that this tissue is present in humans of all ages and the recognition that BAT may not only dissipate energy as heat but may also be a key determinant of weight and musculoskeletal development during childhood.

Browning, is a process induced by cold, adrenaline or muscle hormones which involves transformation of white to Brown adipocytes. Such factors and others possibly unknown activate lipases and other Brown adipocyte proteins that promote triglycerides hydrolysis into fatty acids and glycerol. Increased catabolism leads to increased fat consumption and has been suggested as a potential strategy in the treatment of obesity. However, the factors involved are still unknown.

Keywords: Brown Adipose Tissue

WATER FOOTPRINT OF THE IPC STUDENTS

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Water is an essential resource and constitutes a fundamental necessity for health and survival of humanity, therefore, it is considered one of the basic rights. Water Footprint is based on the quantification of the total water consume. This concept has been recently introduced as an important indicator of the human consume of water, in the attempt of minimizing the environmental impacts.

As goal, this study avaluated the IPC students water footprint. For this, we made a bibliografic revision about the theme and applied an inquiry to IPC students, where we included 63 students. It was found an increase of 26,6% of the individuals that use standard showers and 76,2% (less 5,4% than the previous year) don't take advantage of the rain water. It was also found that 63,5% of the inquired don't close the tap while soaping, 33,3% take more than 10 minutes to shower and 19% don't close the tap while brushing their teeth. About washing the car, 67,7% use hose instead of bucket, which reveals a huge waste of water. Through the analysis of these results, we can understand that the population in study has notion that the water is very precious and it is becoming scarce.

We conclude that it's necessary continue to sensitize the population to saving water consumption.

Keywords: Water Footprint, students, consume of water

EVALUATION OF NOISE IN WAITING ROOMS IN HEALTH FACILITIES

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Based on studies, technological equipment, work materials, health professionals, users and visitors are the main sources of noise. In all sectors analyzed, the noise level is above the limit values. The noise values above the limit have an impact on sleep and consequently on the immune, cardiac, respiratory, gastrointestinal, endocrine, psychic and cognitive functions.

However, despite the different levels of knowledge among the population, the study shows that only 2 in 10 people seek a specialist to perform auditory reviews annually. As you are not always aware of the consequences that can result from hearing loss, experts recommend that you visit a specialist regularly to perform a hearing test as a preventive measure.

It can be concluded that the noise is potentially capable of leading to serious and irreversible injuries to the hearing aid. Therefore it is up to each one to verify the conditions that surround him and to verify if they can be harmful to the health, it is also of extreme importance the annual verification of the conditions of the individual in this case at the hearing aid level. As noted earlier, hearing injuries affect the individual's life in many ways, often leading to their isolation, as they have difficulty communicating with the environment around them.

Keywords: noise, health, professionals, users, visitors

THERMAL COMFORT AND PUBLIC HEALTH

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Thermic comfort is defined by the junction of thermic variables from the job position in which influences the worker's organism. Being a crucial factor that intervenes directly or indirectly in health and wellbeing of the same as in the achieving tasks that were designated to such worker. The objective of this assignment is to approach the importance of thermic comfort, where there are case studies presented on the subject. The methodology used in this report was the revision on the bibliography of the subject.

We verified that in study cases, paper industries are where sites are revealing more in which the environment temperature would pass the limit ($>25^{\circ}\text{C}$). In the laundry mate business offices, it was observed that there are several locations across designated for different of dressings, promoting this way comfort and wellbeing of its employees.

In conclusion, we believe it's necessary technical interventions in a way there will be a greater control and monitorization in that factor, preventing the appearance of anomalies in the populations health.

Keywords: Thermic comfort, worker, health

PATULIN: A MYCOTOXIN IN APPLES***Carolina Reis, Daniela Couto, Joana Tomás, Patrícia Moreira****Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Portugal*

Patulin is a mycotoxin produced by different species of fungi, being *P.expansum* the most important species. It is found mainly in apples or in products made from spoiled apples, such as apple juice. Some experiments have demonstrated that produces several harmful effects, including mutagenicity, teratogenicity, carcinogenicity, immunosuppression and acute intoxications.

Therefore, this review article aims to expand the knowledge about patulin by approaching physicochemical properties and toxicological aspects, as well as its occurrence and strategies of prevention

The systematic review was made from published studies in the English and Portuguese language over the period 2007-2017 in databases, such as: PubMed, Google Scholar, SciELO and B-on. The toxicity of patulin is derived from animal studies and there is little or no experimental, or epidemiological, data on acute or chronic toxicity in humans. It has been suggested that patulin could be a carcinogen at low levels in the diet, but there is no convincing evidence. Although there are only a few studies, it is known that the main route of administration is the oral route and that the metabolization occurs in the liver. Thus, the prevention consists of avoiding the damage that may occur on the surface of apples, by having good agricultural practices during harvesting and transport, as well as storage under appropriate conditions.

In summary, monitoring of patulin levels in susceptible products, such as apple juice, by sampling and analysis can be valuable to guarantee the quality of the products, being the test method of choice the HPLC with UV detection.

Keywords: Toxicology; Mycotoxin; Apple; Patulin; *Penicillium expansum*

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COUMARIN: AN AROMATIC COMPOUND OR A HARMFUL TOXIC?

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Coumarin, also known as α -benzopyrone, was found in the species *Coumarouna odorata* and distributed in the plant kingdom in the most diverse forms.

The coumarin compounds have various pharmacotherapeutic applications as anti-inflammatory, antimicrobial, anti-coagulant and as an adjunct to cancer therapy.

Coumarins are still used by the food industry as a flavoring agent in various food products and alcoholic beverages.

Given the great exposure of man to this toxin, this paper intends to review the literature about the distribution of coumarin, mainly in products for human consumption, its pharmacokinetics and toxic effects and how they interfere with the human's health and daily habits, in order to understand how to proceed when there's a big exposure to this toxin and realize how to work around its effects.

This systematic review was done using the research gates: B-ON, Scholar Google, PUBMED and TOXNET, having as inclusion criterion the literature in the period between 2007-2017.

Due to its organoleptic and pharmacological properties, coumarin's use by the food, cosmetic and pharmaceutical industries has been increasing. However, the high exposure of this compound, namely oral and atopic, results in toxic effects, being hepatotoxicity the most observed. As a result the only way to prevent its effects is decreasing the overall over-consumption of food with this toxin, such as fruits, beer, wine, cinnamon, tobacco and food additives (daily doses 0.1mg of coumarin for kilogram of body weigh).

In conclusion, further toxicological studies are necessary to verify the toxicity related to the oral exposure of coumarin, since the mechanisms that cause susceptibility to this toxin are not yet known in concrete.

Keywords: Coumarin; Hepatotoxicity; α -benzopyrone

TETRODOTOXIN: AN EXTREMELY POTENT MARINE NEUROTOXIN

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BACKGROUND: Tetrodotoxin (TTX) is a potent neurotoxin that in small doses has a large lethality. TTX poisoning is commonly induced by pufferfish ingestion.

AIM: Provide an updated review about the toxicity mechanism of TTX, know the symptoms and clarify how the harmful effects can be prevent.

MATERIAL & METHODS: The research was carried out on the scientific bases: Google Scholar, Pubmed, TOXNET and ScienceDirect. We found about 35 articles.

RESULTS: TTX is produced by marine bacteria and its form of exposure in humans occurs through the alimentary route with the ingestion of foods contaminated by the bacteria. TTX is absorbed by the gastrointestinal tract and found ionized in the blood, then it's distributed through the tissues mainly cardiac and skeletal muscle, being excreted in the urine.

TTX acts on blocking the sodium channels of nerve cells, both at the peripheral and central levels, causing alteration of the transmission of nerve impulses avoiding depolarization of the cell.

The symptoms develop rapidly and includes mild gastrointestinal effects, a descending paralysis and rapid progression to respiratory failure when is severe. The lethal dose of TTX (LD50) is 334µg/kg. There is no antidote to TTX and the existing treatment is respiratory support or gastric lavage.

CONCLUSION: In addition to providing fast and appropriate treatment to patients it's very important to minimize the risk of exposure to TTX through prevention. Due to the inherent risks, the consumption of foods such as pufferfish requires great care in their preparation so that it doesn't represent a danger to public health.

Keywords: Toxicity, Tetrodotoxin, TTX poisoning, Neurotoxicity, Pufferfish

THE LECTINS AND THEIR EFFECT ON THE BODY

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BACKGROUND: Lectins are proteins capable of recognizing specific places in molecules and connect reversibly to carbohydrates. They are capable of promoting the stimulation of lymphocytes and agglutinating erythrocytes and cancer cells. There are four types of lectins but only two presents a toxic effect. They are usually found in grains of legumes and grasses, mushrooms and some vegetable and fruits.

AIM: Understand the effect of lectins in the body.

MATERIAL & METHODS: The systematic review was carried out through the Google academic databases, PubMed and Scielo. This research was based on seven articles, between the years of 2007 and 2017.

RESULTS: Lectins due to their antinutritional properties interfere in the digestion, absorption and nutrient utilization processes, being able to provoke specific reactions important for food safety. Symptoms such as gastroenteritis, imbalance in intestinal flora, inflammation and destruction of epithelial cells, hemorrhages in lymphatic tissues and cardiovascular complications can be observed. To avoid contamination by this antinutrient it is necessary to put the legumes in the sauce and discard the water.

CONCLUSION: We conclude that as lectins are present in some foods, especially in the legumes where they present the greatest amount of these. This situation can be easily controlled using methods such as proper dressing and preparation. In the case of processed leguminous plants, these have less lectins since they have undergone several thermal treatments and water treatments.

Keywords: Lectins; anti-nutricional; organism; toxic effect

MERCURY: HOW DANGEROUS ARE YOU?

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Mercury is a chemical element, integrating the class of transition metals. Methylmercury, a non-reactive organic species of mercury, is an environmental pollutant that easily affects humans through bioaccumulation through the food chain. It is also one of the major heavy metals found in fish.

The aim of this work is to carry out a systematic review to determine the toxic potential of mercury in food and its toxicological process.

In the bibliographic search, we used the electronic databases like Scielo, PubMed and the Scholar Google search engine. The articles of greatest interest published from 2010 to 2017.

Higher concentrations of mercury are found mainly in high trophic species such as swordfish, shark, ray and tuna.

Mercury can be absorbed through the skin, gastrointestinal tract and lungs. It is distributed through the bloodstream reaching the organs, such as the heart, kidneys, skin, among others. Its excretion can occur through breast milk, kidneys, feces and bile. The main target organs of toxicity are the nervous system, kidneys, eyes and skin.

The content of this contaminant is negligible for health if the ingestion of these fish meets the recommendations. Thus, as a way of preventing its toxic potential, it is recommended to decrease fish intake with high concentrations of mercury and to vary the fish that is consumed.

Keywords: Mercury, methylmercury, fish, toxic

LEAD TOXICITY AND ITS EFFECTS ON HUMAN BODY: AN UPDATED REVIEW

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Lead poisoning has been recognized as a major public health risk, especially in developing countries. Exposure to lead produces several effects on various body systems. Oxidative stress has been reported as a major mechanism of lead induced toxicity.

This work provides not only an updated review about the effects and mechanisms of lead exposure, but also to describe techniques to prevent its harmful effects. This review resulted from research of scientific data from databases such as PubMed and Science Direct, involving 10 documents.

The primary means of human exposure to lead are soil, water, air, paint and food like cereals and vegetables, through ingestion and/or inhalation. The amount of lead in food depends on the utensils used during the cooking as well as the food storage. The intensity of the exposure can be influenced by sex, age, diet and culture. Children are more susceptible to the toxic effects than adults. The primary site of lead storage are bones and the nervous system appears to be the most sensitive target for lead induced toxicity. The concerning limit for lead intoxication in children is from 5 to 10 µg/dl, while in the adults is 30 µg/dl.

In addition to appropriate treatment, it is also important to minimize the effects of the lead and specially investing in prevention. Some nutrients can act as antioxidants by rebalancing the oxidant/antioxidant balance impaired due to lead exposure, which shows the important role of nutrition not only during contamination but also in the treatment and prevention of it.

Keywords: lead toxicity, food, exposure, toxicokinetic, toxicodynamics

SCOMBROID POISONING

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Histamine is a non-volatile amine that originates from the decarboxylation of the amino acid L-histidine, through the enzyme histidine-decarboxylase. The disease known as histamine poisoning or intoxication by the scombroid toxin, is caused by consumption of foods (most commonly fish) with abnormally high levels of histamine and other amines. The main objective of this work is to understand the etiology of intoxication, the symptoms resulting from this disease, mechanisms of toxicity, toxicokinetics and ways of avoiding intoxication. The elaboration of this work was based on the research of scientific articles in online platforms such as ScienceDirect (Found three relevant scientific articles since the year 2000) and TOXNET. The production of the toxin is related to the permanence of food at room temperature for a long period of time, which allows the proliferation of bacteria and development of the toxin.. Several hypotheses have been put forward to explain why histamine consumption in spoiled fish is more toxic than histamine taken orally, from toxicity-enhancing compounds to detoxification-inhibiting compounds. Symptoms may range from gastrointestinal, hemodynamic to neurological. The best way to prevent intoxication is to ensure fish tracing, by guaranteeing adequate maintenance of food temperatures from production to consumption. Histamine concentrations related to spoiled fish are extremely variable, as well as the toxic dose. The key to keeping bacterial numbers and histamine levels low is the rapid cooling of fish after catching, and the maintenance of adequate temperatures during handling and storage. Thus, it is necessary to apply the principles of risk analysis and Hazard Analysis and Critical Control Points (HACCP).

Keywords: Scombrotxin; Histamine Toxicity; Scombroid Poisoning

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ARSENIC: TOXIC OR NOT

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BACKGROUND: Arsenic (As) is a chemical element, considered toxic and widely distributed in the biosphere. As it shares physical and chemical characteristics of both metals and amethals it is considered a metalloid. The main food contaminated by this element is rice and its derivatives, as well as biscuits, milk flours and cereals.

AIM: Understand the distribution of arsenic in the biosphere and in some foods, as well as the entire toxicological process in the human organism.

MATERIAL & METHODS: As a method of data collection, we use online platforms such as Google Scholar, b-on, Scielo, PubMed and ScienceDirect. Were selected four articles between 2010 and 2016. This is an observational cross-sectional or prevalence study.

RESULTS: The toxicity of As depends on its oxidation state, pH and speciation. FAO / WHO establishes as tolerable a maximum absorbed amount of inorganic arsenic of 0.002 mg/kg body weight/day. The main routes of absorption of arsenic are ingestion and inhalation. Blood is the major carrier vehicle. Inorganic arsenic is metabolized in a sequential process involving a reduction of electrons, followed by oxidative methylation. The predominant metabolite of inorganic arsenic is dimethylarsinic acid (DMA) and its toxic effect is conditioned by exposure factors, such as the individual's age, mineral composition of foods and atmosphere and administered dose.

CONCLUSION: The apparent human sensitivity, combined with our incomplete understanding about mechanisms of carcinogenic action, create important public health concerns and challenges in risk assessment, which could be met by understanding the role of metabolism in arsenic toxicity and carcinogenesis.

Keywords: Arsenic, toxicity, exposure sources, contamination

AFLATOXIN B1

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Mycotoxins are secondary metabolites, highly toxic, produced by filamentous fungi and able to contaminate almost all foods. Aflatoxins are the most abundant and toxic, with aflatoxin B1 (AFB1) being the most predominant.

The aim of this work is to fulfil a systematic review that let us know AFB1 and understand the mechanisms by which it affects the human being.

A research was carried out in several databases, specifically, PubMed, Scielo, B-on, Google Scholar, Toxnet and ScienceDirect.

Humans can be contaminated by aflatoxins through the consumption of peanuts, corn, nuts, wheat flour, milk and other agricultural foods. Aflatoxins have harmful effects on human health and are considered hepatocarcinogenic, mutagenic and teratogenic. AFB1 is mostly absorbed in the small intestine, being reversibly bound to albumin and other proteins in the circulation. Then it's distributed through several tissues, like the liver, blood cells and bile. For toxic effects to occur, this requires metabolic activation, whose activated form is the 8,9-oxide compound of AFB1. The primary route of excretion of absorbed AFB1 metabolites is urine, while AFB1 not absorbed is normally eliminated by faeces.

Because they don't exhibit decomposition when subjected to temperatures above 100°C, they aren't eliminated during normal food processing, such as cooking and pasteurisation. In practice, aflatoxins have been detected by physical-chemical (chromatography) and biological (bioassays and immunoassays) techniques.

Aflatoxin contamination often occurs in food and represents a threat to human health and that's why we should work towards prevention, because this still is the best way to ensure food safety.

Keywords: Aflatoxin B1, toxinfection, carcinogenic, food

VENTRICULAR ANEURISM - TAKOTSUBO SYNDROME

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The Takotsubo Syndrome is characterized by a transient ventricular systolic dysfunction that mimics an acute coronary syndrome. It is a reversible myocardopathy and it resembles a ventricular aneurysm due to its shape. Occurs mostly on postmenopausal women but it can also affect other ages and gender. The left ventricle is mainly the most affected, demonstrating apical akinesia and basal hyperkinesia as compensation.

Several hypotheses have been considered as the etiology of this condition, like spasms of microvascular coronary circulation or endothelial cells dysfunction. Currently, the physical or psychological stress has been mainly accepted as the triggering cause: the cardiotoxicity provoked by the release of catecholamines will act on the sympathetic nervous system, increasing the cardiac frequency and ventricle contraction dysfunction by overloading the cardiac myocytes with calcium.

This myocardopathy presents itself as retrosternal thoracic pain, similar to angina, or dyspnea with ST-T elevation and abnormal segment contractions and slight increase of cardiac enzymes, simulating an acute coronary syndrome. Coronary angiography is used to achieve differential diagnosis, excluding obstructive arterial disease; however, it is a temporary condition and it ends solving within days or weeks. The treatment is uniquely based on hemodynamic support.

Keywords: Takotsubo Syndrome; Transient ventricular systolic dysfunction; Acute coronary syndrome; Stress.

PRE-EXCITATION SYNDROMES

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Pre-excitement syndromes are uncommon but have intrigued cardiologists since the first description of Wolff-Parkinson-White Syndrome, in 1930.

Normally, the electrical contact between the atria and the ventricles exists only at the atrioventricular node (AV) and physiologically, the electrical depolarization wave allows the atria to contract before the ventricles. However, the pre-excitation is a cardiac arrhythmia in which the ventricles of the heart become depolarized too early, the electrical stimulus passes to the ventricle via an accessory pathway faster than normal, which leads to their partial premature contraction. All pre-excitation syndromes have at least one abnormal conductive pathway and can exist in a variety of anatomical locations. These bypass tracts formed during cardiac development can conduct impulses either anterograde (the majority), retrograde (15% of cases) or in both directions (rare).

The main syndromes are: The Wolff-Parkinson-White (WPW) pattern results from an accessory pathway, the "Kent bundle", which directly links the atria to the ventricles, bypassing the atrioventricular (AV) node showing short P-R interval. The Lown-Ganong-Levine (LGL) Syndrome is due to faster atrioventricular nodal conduction via "James bundle" showing short PR interval and usually palpitations and supraventricular tachycardia. The Mahaim-Type Pre-excitation results from a nodoventricular or fasciculoventricular accessory pathway, the "Mahaim fibers", showing normal P-R interval. Both WPW and LGL syndrome occur arrhythmias, such as tachycardias, premature beatings, atrial fibrillation, ventricular fibrillation, and sudden death.

The first line treatment symptomatic patients is an antiarrhythmic drugs. It's also done electrical ablation or surgical treatment depending on the severity.

Keywords: Pre-excitement syndromes; Accessory pathway; Atrioventricular node, Conduction.

AMBULATORY BLOOD PRESSURE MAPPING AND HYPERTENSION

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Hypertension is one of the risk factors for cardiovascular disease. Blood pressure values may be directly related and influenced by changes in lifestyle and by people's working conditions, such as stress or real happiness situations.

Ambulatory blood pressure mapping is a noninvasive technique whose goal is to take constant measurements of blood pressure, usually for 24 hours. It's performed under conditions of daily routine and with light exercise.

The main clinical applications of ambulatory blood pressure mapping are with essential arterial hypertension, difficult control or refractory arterial hypertension, symptoms of hypotension in patients with antihypertensive therapy, evaluation of patients resistant to therapy, paroxysmal or episodic hypertension, autonomic dysfunction, study in special groups and evaluation of therapeutic efficacy.

For the realization of the exam, the technician of cardiopneumologist puts a clamp of adequate size in the non-dominant patient's arm. The device is programmed to take readings at intervals defined by the technician, according to the purpose of the test. The patient is informed that when each measurement is started, his arm should be extended. If he moves his arm at the time of measurement, the clamp will continue to inflate. Subsequently, the measurements obtained are analyzed through appropriate software, providing objective information about the study.

It has as main advantages the accomplishment of multiple measurements, which makes it more reliable and rigorous, the accomplishment of measurements without interfering in the daily routine, good reproducibility, detection of momentary changes in the blood pressure and programmable intervals between measurements.

Keywords: Ambulatory blood pressure mapping and hypertension

COMMOTIO CORDIS

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The “Commotio Cordis” term was first used in the nineteenth century and, in the last two to three decades this phenomenon has occurred mainly in children and teenagers that practice sports, specially baseball, hockey and softball.

In Commotio Cordis there is a sudden and non-penetrant impact, done by a round object, like a ball or a fist, with big roughness, in the pre-cordial region causing sudden death. This impact does not causes structural cardiac damage but it causes tachyarrhythmia that the most severe is ventricular fibrillation. However to all this happen the impact must occur in repolarization, more precisely fifteen to thirty milliseconds before de T-wave peak in the electrocardiogram.

Although rare, Commotio Cordis constitute a tragic event with a big social impact, being it survival rate only of fifteen percent.

It is important to adopt preventive strategies that include not only the population formation but also the investment in protective equipment and the availability of external automatic defibrillation in sportive enclosures.

Keywords: Commotio Cordis; Sudden Death; Sports.

MYOCARDIAL PERFUSION SCINTIGRAPHY AND CORONARY HEART DISEASE

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Coronary heart disease is generated because it exists an artery spasm that reduces the blood flow. It causes issues of ischaemia that is, myocytes aren't oxygenated and nourished. The narrowing of coronary arteries is due to the formation of atherosclerotic plaques. The formation of atherosclerotic plaques is favored by behaviors and lifestyles, such as obesity, smoking, unbalanced eating and stress.

Coronary heart disease is manifested by precordial pain (angina pectoris), which results from a deficit in myocardial perfusion. When perfusion deficit is more prolonged, resulting in necrosis-myocardial infarction. Myocardic cells can be or not viable and that can be analyzed in scintigraphy.

This presentation consists in a comparison between coronary heart disease and Myocardial Perfusion Scintigraphy. What is more useful for coronary heart disease diagnostic? Electrocardiography or Scintigraphy?

Scintigraphy is a method that uses a radiopharmaceutical, administered usually intravenously. The distribution of blood flow in the myocardium is studied and areas of lower radiopharmaceutical capture are areas of lower perfusion, associated with ischemia or necrosis. One of the main advantages is its non-invasive method.

To do Scintigraphy, it is necessary a gamma camera that rotates 180° around the patient, allowing the acquisition of images. To achieve the physical stress, the radiopharmaceutical is administered at peak effort.

We can conclude that scintigraphy is more specific for coronary heart disease diagnostic because it detects perfusion alterations, while electrocardiography detects later changes.

Keywords: Coronary Heart Disease; Myocardial Perfusion Scintigraphy; Ischaemia; Myocardial infarction.

ABLATION IN ATRIAL FIBRILLATION

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Atrial fibrillation is a type of cardiac arrhythmia in which there are fast and irregular beats. This irregularity is due to the fact that the auricles, which receive blood entering the heart "fibrillate" instead of contracting normally.

Some people have some factors that are likely to trigger atrial fibrillation, such as high blood pressure and thyrotoxicosis. The disease also has some symptoms, which people should not let go unnoticed.

The treatment of this disease depends on the duration of the arrhythmia, the probability of recovering the sinus rhythm, among others. Thus, methods for the treatment of the disease have been developed when it is not possible to resolve it with antiarrhythmic drugs. We have catheter ablation by isolation of the pulmonary veins, where there is irreversible destruction of the cells at the junction of the pulmonary veins with the left atrium, so that they can not conduct electrical signals. Radiofrequency catheter ablation is another method in which injuries are created by creating an electrical barrier that isolates the pulmonary veins of the left atrium without damaging the physical integrity of the tissues. Ablation of the atrioventricular junction and pacemaker are one of the techniques in which an area of tissue in the atrioventricular node is destroyed to prevent rapid electrical impulses from passing from the atria to the ventricles. This intervention often blocks all electrical impulses, so it is necessary to later implant a pacemaker to control heart rate and rhythm.

Keywords: Atrial fibrillation; Ablation; Pacemaker.

SUDDEN DEATH IN SPORT

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It is defined as sudden death related to exercise, the death of cardiac cause that occurs during the accomplishment of physical activity or until an hour after its end. The annual incidence is 1: 200,000 in the USA and 1: 100,000 in Europe (Italy). Although rare, sudden death in the athlete has a very significant impact on society, by mediation of cases and the ideal we have of athletes. The practice of physical exercise in a regular, moderate and oriented way confers improvement in our health. However, the practice of high intensity exercise that occurs in many sports may paradoxically increase the risk of sudden death. This fact has been studied with the knowledge that intensive physical and emotional stress can trigger events in patients with previously unsuspected cardiac disease, that is, it may work to unmask a problem that has always been there.

The causes depend on age, being the main ones: acute myocardial infarction, and changes in the structural and electrical conduction of the heart. And the main risk factors are: high blood pressure, obesity, smoking, diabetes, high cholesterol and triglycerides.

As the number of athletes has been increasing in the last years, with an age of beginning of the sporting practice more precocious and being the ECG valuable in the pre-sport screening it is important the implantation of programs of screening of heart disease to school age and athletes, and to make people aware of warning symptoms / signs as a form of prevention.

Keywords: Death; Exercise; Athlete; Intensity; Cardiac.

CHAOTIC AURICULAR RHYTHM

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Chaotic Atrial Rhythm, Chaotic Atrial Mechanism or Multifocal Atrial Tachycardia (MAT) is an abnormal heart rhythm classified as supraventricular tachycardia, which causes cases of advanced age and cases of an exacerbation of COPD.

In electrocardiographic terms, this type of pathology is characterized by the existence of at least 3 different morphologies of the P wave in the same derivation, associated to a heart rate greater than 100 beats per minute. In addition, it is possible to observe narrow QRSs and variable PR intervals. Chaotic Atrial Rhythm can also acquire a designation of Multiforme Atrial Tachycardia, associated with the fact that P wave have a morphological variability.

Following this theme, it is present a clinical case of a 68-year-old male hospitalized due to pneumonia and exacerbation of COPD. In addition, the patient is a smoker (80 UMA), has a blood pressure of 100/60 mmHg and a tachycardia of approximately 120 beats per minute in association with active wheezing. Multifocal atrial tachycardia (MAT) was confirmed.

In conclusion, Chaotic Atrial Rhythm is a secondary phenomenon to a precipitating cause, its therapy pass by aggressive reversal of the underlying cause. In this way, its prognosis varies according to the cause associated.

Keywords: Chaotic atrial rhythm; P wave morphology; Heart rate; Electrocardiogram.

ATRIAL FIBRILLATION: RHYTHM CONTROL VS FREQUENCY CONTROL

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Atrial fibrillation is the most prevalent arrhythmia that causes an irregular heartbeat. The causes of this pathology are unknown, it is only known that there are some risk factors, and that it is related to the advancing age so has already been described as the “new epidemic”, in relation to the growing increase of the elderly population.

Because of this irregularity in the electrical circuit of the heart, the atria, instead of contracting and distending normally, only ‘quivers’, which may cause a decrease or even stagnation of blood flow, with risk of serious complications, such as, for example, stroke and heart failure.

There are several treatments for this pathology such as antiarrhythmic drugs, intervention therapy or drugs for the treatment of risks associated with atrial fibrillation. Concerning pharmacological therapy, the main question about atrial fibrillation concerns the dilemma between controlling the rhythm, in other words acquiring and maintaining a normal sinus rhythm, or controlling the frequency, that may in particular have to be reduced.

Keywords: Arrhythmia; Atrial fibrillation; Rhythm.

VASCULAR CEREBRAL ACCIDENT

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Cerebral Vascular Accident (stroke) is the first cause of death in Portugal and one of the main causes of death in the world.

Strokes happen due to the incapacity to maintain the blood supply to the cerebral region dependent of the occluded artery or by bursting of a damaged artery. This cut in the blood supply can happen in two different ways: ischemic (most frequent) or hemorrhagic (higher mortality rate). Ischemic strokes happen due to thrombotic occlusion of a cerebral artery, leaving in hypoxic suffering the region dependent on this occluded artery. Hemorrhagic strokes occur due to rupture of a blood vessel with consequent leakage of blood in the affected area.

Thrombi can be formed in various ways: atherosclerosis, thickening of blood, dilated cardiomyopathies or by failure of contractile myocardial function, arrhythmias such as atrial fibrillation (which is proving to be the cause of much of the primarily cryptogenic strokes).

This accident (literally, because it happens suddenly and unexpectedly) can cause serious, irreversible and incapacitating injuries, especially if no immediate measures are taken to reverse the neuronal suffering, and subsequent necrosis.

In this poster we will be focusing on cases which strokes are proved to be caused by atrial fibrillation, in patients who knew to have this pathology and in patients who discovered after suffering the stroke. It is also important to emphasize the importance of knowing whether or not the patient has this type of arrhythmia in terms of preventing and reducing the damages caused by the stroke.

Keywords: Stroke; Atrial fibrillation; Prevention.

BIOCHEMICAL MARKERS OF ACUTE MYOCARDIAL INFARCTION

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Acute myocardial infarction (AMI) is caused by the block of a coronary artery or one of its branches owing to a thrombus, consequence of the rupture of an atherosclerotic's plaque. Infarction occurs when the thrombus blocks the access of the blood to a zone of the heart's muscle, injuring the heart.

Biochemical markers are substances released into the blood when the heart has any type of injury. When tested, these help in the diagnosis, assessment and control of patients where there is suspicion of Acute Coronary Syndrome and chest's pain.

With this project, we conclude that the biochemical markers most used to detect AMI are myoglobin, troponin, creatine phosphokinase and creatine phosphokinase MB.

In addition to altering biochemical markers - AMI is characterized by the rise and fall of cardiac enzymes in circulating blood - the diagnosis of AMI is still based on the suggestive clinical and electrocardiographic changes typical of AMI, namely the presence of pathological Q waves.

However, although there are three criteria for the diagnosis of AMI, a significant percentage of patients with AMI do not present symptomatology suggestive of myocardial ischemia, as well as a considerable proportion of patients with AMI present normal electrocardiographic tracings.

Therefore, because of these factors, biochemical markers are the most reliable and essential indicator for the diagnosis of AMI.

Keywords: Marcadores bioquímicos; Enfarte agudo do miocárdio.

DIABETES AND CARDIOVASCULAR DISEASE

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Diabetes, mostly type II, besides from being a disease, is also a major risk factor associated with the development of cardiovascular diseases, such as angina pectoris, acute myocardial infarction, stroke and peripheral vascular disease. That said, diabetics have an increased risk of cardiovascular disease, which is about twice as much as the non-diabetic population.

A particularity of these risk factors is that, worse than accumulating, they potentiate one another, that is, they aggravate each other, meaning diabetes leads to the appearance or aggravation of other risk factors for cardiovascular diseases. Thus, it is essential to closely monitor other cardiovascular risk factors, such as smoking, hypertension, dyslipidemia, sedentary lifestyle and obesity.

Cardiovascular complications are the leading cause of death in the diabetic population, particularly type II diabetes, accounting for about 75-80% of all registered deaths. That said, diabetics should control or prevent diabetes, in order to reduce cardiovascular disease's risk, by controlling cholesterol and blood pressure, reducing salt intake, controlling blood glucose, stopping to smoke, protecting the kidneys and exercising regularly.

Concluding, it is essential to invest as much as possible in diabetes prevention and in the arising of major cardiovascular events, with a better control of risk factors and an adequate adherence to therapeutics, as well as a healthier lifestyle, with a balanced diet and physical exercise.

Keywords: Diabetes; Cardiovascular diseases; Risk factors.

LEFT VENTRICULAR HYPERTROPHY AND SPORTS

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Left ventricular hypertrophy is, usually, one of the first evidences of the cardiac remodelling in systematic training.

With the sports, the heart of athletes, as well as all the cardiovascular system, presents a wide range of morphologic and physiologic changes induced by continuous effort and intense enough. The adaptation to sports aim to improve the heart's function as a bomb and the cardiovascular supply of oxygen to the exercised muscles.

Interpretation of ECGs in athletes is complicated by physiological changes related to training.

Cardiovascular remodelling in the athlete is frequently associated with physiological ECG modifications. Modifications will vary depending on the type (isotonic and isomorphic components), duration, regularity and intensity of the athletic conditioning.

Fundamental to the appropriate evaluation of ECG is an understanding of the findings that may indicate the presence of a pathological cardiac disease, such as, hypertrophic cardiomyopathy recognized as the commonest non-traumatic cause of sudden death in young athletes.

Keywords: Left ventricular hypertrophy; Electrocardiogram; Sports.

ARTERIAL HYPERTENSION - SILENT DISEASE

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Nowadays, hypertension is the most commonly observed cardiovascular disease. It's characterized by placing the blood vessels under high permanent pressure and may damage them by stiffening them.

Each heartbeat ejects blood into the arteries and distributes it throughout our body, and blood pressure is created by the force that the blood makes on the walls of the arteries.

The higher this pressure, the harder will be for the heart to pump the blood and, therefore, the greater the risk of injuring the heart and the vital organs' blood vessels such as the brain and kidneys.

The blood pressure increases when the heart contracts for blood be expelled into the arteries (systole) and carry oxygen to all tissues - systolic blood pressure (SBP); And when the heart relaxes (diastole), at the same time there's irrigation of it, blood pressure decrease - diastolic blood pressure (DBP).

There are two types of hypertension: Primary or Essential Hypertension, in which its cause is unknown, and Secondary Hypertension, which is the consequence of another medical condition. This disease does not have a known cure, but it's easily controlled with pharmacological therapy and/or by decreasing the risk factors, but there is a great problem: most people with arterial hypertension don't feel the disease, it means, is asymptomatic in a precocious phase, hence called "Silent Killer" or Silent Disease. Once discovered, it's already more serious, creating many other systemic damages.

Blood pressure has several levels according to systolic and diastolic arterial pressures in the assessment of a normotensive or hypertensive condition: optimal, normal, grade 1 (mild) hypertension, grade 2 (moderate) hypertension, grade 3 (severe) hypertension and isolated systolic hypertension.

It should be noted that one of the main diagnostic exams for hypertension is Ambulatory Blood Pressure Monitoring (A.B.P.M), which consists of measuring blood pressure in a 24-hour period with predefined measuring ranges.

Keywords: Arterial hypertension; Blood pressure; Systolic blood pressure; Diastolic blood pressure; Silent disease.

STRESS TEST IN THE DIAGNOSIS OF CORONARY ARTERY DISEASE

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The stress test studies the electrocardiographic response to exercise, the functional capacity, and physical fitness. This exam allows us to examine the response of an individual, by observation of various parameters, to a physical exertion induced and controlled with electrocardiographic monitoring featuring uninterrupted and continuous blood pressure measurements. Exercise is the physiological response to the most common stress in our body, imposing a greater requirement of the cardiorespiratory system. Therefore, stress is considered the first line test for the diagnosis of coronary diseases.

This test to have indication for the diagnosis of heart diseases specific and absolute and relative contraindications. The protocol most used in this test is the Bruce protocol.

Coronary heart disease is the accumulation of fat and fibrous tissue inside the coronary arteries and can lead to narrower blood vessels. Thus, it causes a decrease in blood supply to determined areas of the heart muscle, triggering a type of chest pain called angina pectoris.

For the test to be considered positive in the diagnosis of coronary disease, it has to meet a determined criteria, in which the most sensitive is the appearance of depression ST horizontal or descending ramp, greater than 0.1mV and with a duration equal to, or bigger than 0,08 seconds. Following this subject, I present a patient, with 69 years old, asymptomatic before, after and during the exam, with ST depression during and after exertion.

Keywords: Stress test; Coronary disease; Angina pectoris; Segment ST.

INTERACTIONS OF DRUGS ON FOOD: THE KNOWLEDGE THAT PEOPLE SHOULD HAVE.

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BACKGROUND: Interactions can occur between a drug and a nutrient, multiple nutrients, food in general, specific foods or components, or nutrition status.

Drugs like antacids, laxatives and antibiotics can difficult the nutrients absorption.

With ongoing advances in recognizing interactions and understanding how they work, patient care can be further improved.

AIM: To describe the interactions between drugs and nutrients and their clinical impact.

MATERIAL & METHODS: The search was made in PubMed electronic database and was limited to articles that were published within the previous 13 years (between 2004 and 2017), written in English and Portuguese. We found 6 articles: 4 reviews, 1 about therapy in elderly people and 1 about an example of an interaction.

RESULTS: The results show that interactions between nutrients and drugs are an important clinical subject due to potential changes in the expected effects of the drug. Drugs like diuretics, steroids, angiotensin-converting inhibitors and calcium supplements can enhance or inhibit nutrient bioavailability.

CONCLUSION: The deficiencies of absorption of micronutrients as well as macronutrients don't occur only based on the chemical reactions between drugs and nutrients but also are affected by the type and dosage of some drugs and the duration of treatment. Elderly people, who usually take multiple medications for a long period of time, are often found with nutrient deficiencies. The drug-nutrient interaction phenomenon can occur before or during gastrointestinal absorption, during distribution and storage in the tissues, in the biotransformation process, or even during excretion. Drugs may interfere with the body's fluid and electrolyte balance that influence digestive processes.

Keywords: Drug-food interactions, drug-nutrient interactions, drug interaction, nutrition

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INFLUENCE OF MEDICATIONS ON THE NUTRITIONAL STATUS OF PATIENTS

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Background: The Nutritional Status corresponds to the balance between nutritional needs and their satisfaction. The food has a great influence on the action of the medicines and in the state of health of the individuals. • AIM Investigate the influence of Medications on the Nutritional Status. Material & Methods: Apifarma, Order of Pharmacists, Hollyfar book: "Handbook of Food-Drug Interactions." However, in all the databases used, none of them referenced a specific study period, only the influence of Medications on the Nutritional Status of Patients in general. • Results The nutrients are absorbed, mostly, in the small intestine, which is common occurrence of interactions in the gastrointestinal tract. There are several factors that can influence the absorption of nutrients and medicines interfere with many of them. The most susceptible to decrease the absorption of nutrients are usually those whom damage the intestinal mucosa. Some medications still report an antagonistic effect to vitamins, inducing hypovitaminosis situations. However, once the organism has some reserves of vitamins, these interactions may not have great effects. Other medications, due to its emetic properties, or their effects on appetite, the taste, smell or saliva production, may lead to decreased food supply, and can cause weight loss or, lead to unexpected weight increases. • Conclusion The medicines are one of the factors that contribute to the malnutrition in susceptible risk groups. The knowledge of the patient's characteristics and the effect of medicines can help fix, or even prevent, nutritional deficiencies. In this way, you can improve the prognosis of the patient.

Keywords: Nutritional Status, Drugs, AMI

GRAPEFRUIT JUICE AND ITS INTERACTION WITH WARFARIN

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BACKGROUND: Furanocoumarins and Naringenin are organic compounds found in grapefruit juice, which are known to inhibit CYP450's superfamily, where CYP3A4 (one of warfarin's metabolism responsible enzymes) belongs. This increases prothrombin time/INR, leading to haemorrhagic complications.

AIM: Investigate the interaction between grapefruit juice and warfarin.

MATERIAL & METHODS: It was conducted a research on PubMed's database and in websites like PTINR.com and Ordem dos Farmacêuticos. The search was limited to single case studies, case reports and revision articles/publications in portuguese and english between 2009 and 2016. In PubMed, from the 11 articles found, we used 3, complemented afterwards with the other sources's information.

RESULTS: A patient's INR was high after he, previously taking warfarin, consumed grapefruit the week before. The patient then discontinued consuming any form of it and the warfarin dose was reduced, returning the INR to an appropriate level. Soon after, he increased the dose of warfarin again and his INR was within therapeutic range.

In another study was shown that 50 ounces/day increased the patient's INR, while only 24 ounces/day for one week had no significant effect.

It was also observed that was required an interval of 3 days (intestinal CYP3A4' activity renewal time) between grapefruit juice's ingestion and the drug intake completely offsetted the interaction's risk.

CONCLUSION: The pharmacokinetic profile and effect of grapefruit juice, especially in large quantities, on CYP3A4 makes plausible an interaction with warfarin. Therefore, is crucial considering close follow-up in patients on warfarin who drink grapefruit juice.

Keywords: Warfarin, fruit juice, grapefruit, interaction, International Normalized Ratio (INR)

PHARMACOKINETIC INTERACTIONS BETWEEN DRUGS AND NUTRIENTS

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In our system, the drug goes through three stages: pharmaceutical, pharmacokinetic and pharmacodynamics. Pharmacokinetic includes the processes of absorption, distribution, metabolism and excretion.

Recent reports shown that dietary substances elicit an influence on drug absorption particularly in the gastrointestinal tract. Inhibition of metabolism and active efflux in the GI tract would be expected to increase systemic drug exposure enhancing the effect and toxicity while the inhibition of active uptake would produce a completely opposite result.

The article we used has as purpose compare the administration of the drug intravenously and through a probe regarding the bioavailability.

It was performed a case study in which the subject was “interactions between drugs and enteral nutrition”. This study was realized with a 77 years old patient with Parkinson's disease. The pharmacokinetic study approached the interaction between an antibiotic (gatifloxacin) and the nutrients administered by catheters.

The results revealed that nutrition by a probe, along with gatifloxacin administration, doesn't affect the plasma concentration of this drug. Therefore, in this case, the nutrients administrated did not affect the absorption of the drug: the degree of interaction was low. However, in other cases, it may occur a decrease of the absorption of the drug with enteral nutrition (e.g. administration of warfarin), depending on the type and degree of the interaction.

In pharmacokinetic processes, beside the dose, it must be choose an administration route (such as enteral-oral), and intervals between doses, calculated in function of the drug excretion time.

Keywords: Pharmacokinetic interactions; Drug absorption; Interactions drugs and nutrients; Enteral nutrition; Metabolism.

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DAIRY PRODUCTS (CALCIUM) AND DRUGS

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Milk along with many other foods can interfere with antibiotics, as well as other drugs. The use of dairy products containing calcium may cause a chemical interaction and not a metabolic interaction.

We are going to study the interaction of calcium in the pharmacokinetics of some drugs. We aim to demonstrate that there is no need for calcium restriction in our diet, since there are ways to work around the situation.

The time line we based our research goes from 1990 until 2017. We found four good review articles and for that we searched in Portuguese and English, on sites like scielo, all in the internet. In order for oral antibiotics to be effective, they must be absorbed from the gastrointestinal tract, make their way into the bloodstream, and be delivered to the infected area.

The classic family of antibiotics that cannot be taken with milk are the tetracyclines, because the calcium in the milk binds the antibiotic and prevents gut absorption.

The calcium affects the absorption of other drugs like aminoglycosides and quinolones, and consequently their bioavailability.

As a general rule, administration of dairy products and/or calcium supplements should be separated from the interacting drug by at least two to four hours.

Keywords: Calcium, dairy products, interactions, absorption, pharmacodynamics

FOOD-DRUG: A SILENT INTERACTION?

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Background: The nutrients are able to interact with drugs, modifying the pharmacological effects of the drug. This is due to the changes in the risk-benefit ratio of the use of a particular drug, and these interactions are quite facilitated, since the drugs are mostly administered by oral route(3).

Aim: To study the importance of considering as food-drug interaction in the nutritional and pharmacological approach(1), to understand the intervening processes and the clinical manifestations arising from these interactions. Material & Methods: A review of 20 articles was done. Of these, only 9 were used for research, centralizing it between 2005 and 2015. The main search engines were Pubmed, Google academic, Science direct and SciELO and specialized literature. Results: These changes can be avoided by: separation of the administration period of the medicines(6,8,9), co-administration with meals (NSAIDs)(5); the improvement of total caloric intake (influence acidic, hyperlipidic, hyperproteic and fiber rich diets)(7) or only one specific food/nutrient; increasing the dose of the drug; or modification of the type of drug/food administration itself, emphasizing as major agonist or antagonist interactions, the grapefruit with warfarin; phytates with iron absorption; Calcium and vitamin D with tetracyclines; Potassium/Sodium/Magnesium with diuretics and proteins with Levodopa (5,6,7,8,9). Conclusion: Medications given orally can then interact with various fruits, vegetables, herbal medicines or even dietary supplements(2). These interactions may be responsible for changes in plasma concentrations of the drug, which may decrease its efficacy or lead to toxicity, which can be life-threatening(1).

Keywords: Food-Drug Interactions, Nutrition

VEGETABLES, FRUITS AND MEDICINES IN INTERACTION

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Vegetables and fruits, due to its high content in micronutrients, can interact with medicines, in pharmacokinetics and pharmacodynamics. However, medicines can also influence the nutritional state of the diseased. It's our goal to let you know the interactions between vegetables and medicines, as well as examples. We resort to scientific articles to sustain our work and to a lecture taught by a doctor student of Pharmacology. After our research, we concluded that the balanced contribution of vitamin K in the diet is important in medicated patients with oral anticoagulant. This vitamin can lead to a resistance to warfarin (anticoagulant), because the first activates coagulation factors, increasing the index of blood coagulation, so it will cancel the effect of the medicine. This is a good example of an antagonism reaction. On the other hand, the deficit of vitamin K enforces the warfarin action that can lead to bleeding. Both examples reflect pharmacodynamic interactions. Most fruits can inhibit the enzymatic complex CYP450, such as orange, grapes, etc, when in contact with CYP3A4, present in the intestinal wall, increases the bioavailability of some medicines (erythromycin), having consequences in their metabolization, increasing toxicity. This is an interaction of pharmacokinetics. Not all interactions are negatives, an example of this (synergism) are vegetables rich in vitamin C which contributes to a better absorption of medicines (antihypertensive). On the other hand, medicines can interfere on the using of nutrients, such as those used on chemotherapy which compete with vitamins, (hypovitaminosis), which interferes in the nutritional state of the patient and consequently on the oncologic treatment.

Keywords: nutrient/medicine interaction; Vitamin C, Vitamin K, vegetables

EFFECT OF DRUGS ON APPETITE AND SENSORY FOOD PERCEPTION

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The control of nutrient intake and homeostatic equilibrium state depend on signals that act directly on the CNS, resulting in a set of adaptive responses.

We will thus develop the effect of the drugs on appetite, incorporating both stimulators and inhibitors; the unwanted effects that result from taking others that bring consequences to the palate, leading as people to change their food, and even aggravate other pre-existing problems. We resorted Web MD website; An article review "Drug-related taste disturbance" (November 2010), as well as a master's thesis entitled "Regulation of Appetite and the Role of Pharmacology" by Susana Correia, 2012.

Certain drugs interfere with the mechanisms of appetite control, for example, by inhibiting the receptors of certain neurotransmitters, functioning as analogues of certain peptides (GLP-1 analogs). This results in an inhibition of appetite, leading to weight loss. These drugs are used, in severe cases, for obesity therapy.

Conversely, there are other drugs used to treat other pathologies (such as tetracyclic antidepressants, antihistamines) that lead to the release of certain hormones and neuropeptides that stimulate appetite. This type of drugs, although this is not their main objective, can be used in groups at risk where weight loss is inherent.

Concluding, although its therapeutic effect does not have this purpose, some drugs can be used to stimulate or inhibit appetite. On the other hand, they may become non-advantageous when used for their normal therapy and cause these effects resulting in an increase or decrease in weight.

Keywords: Sensory Perception, Appetite, Palate, Food

EMERGEN-C

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Background: Vitamin C is a molecule that it's not synthesized by human. It's essential for the synthesis of collagen and regulation of the body. The deficiency results in a set of pathologies that affect the connective tissue. According to the Portuguese Food Wheel Guide, one portion of fruit contains about 14 grams of carbohydrates, and we should eat 3 to 5 servings daily. The recommendations for vitamin C intake are between 45mg and 90mg per day.

Fruits with high content of vitamin C (orange, clementine and kiwi) will be discussed.

Material & Methods: We determined the portions corresponding to the 14g of carbohydrates, weighing the whole fruits (TW) and edible weight (EW). We used the Food Composition Table from INSA as a source of information on the amount of carbohydrates to determine the weights corresponding to 14g, as well as vitamin C.

Results: According to the calculations, the portions of fruit used had: 13.6g (kiwi); 18.9 (clementine) 19.3g (orange) of Carbohydrates, relative to the weight of the portions, we obtained: kiwi-150g (TW) 125g (EW); clementine: 230g (TW) - 170g (EW); Orange: 300g (TW) - 217g (EW). Calculations of 14g of Carbohydrates: kiwi-129g (EW); Clementine - 126g (EW); Orange - 156g (EW). The portions had respectively: 90mg, 50mg and 89mg of vitamin C.

Discussion and Conclusion: Since the daily recommendation of fruit is 3 to 5 servings, the recommended value of vitamin C is easily exceeded, and there is no risk of nutritional deficiency.

Keywords: Vitamin C, Fruits, Food Wheel, Carbohydrates, Portion

HYDRATION CAPACITY OF MELON, STRAWBERRY AND PAPAYA

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Background: Water is the main component of our body, and thus being hydrated is essential for a correct maintenance of our metabolism. In this way, fruits can contribute significantly to body hydration due to the water content in its composition.

Thus, the main purpose is to determine the amount of water for each piece of fruit and the portion of fruit that makes up 14g of the carbohydrates, according with the Food Wheel guide.

Methods: It consists of six distinct stages: 1st fruit washing (melon, strawberry and papaya); 2nd Weighing of fruits (gross weight); 3rd Preparation of the fruits (to remove the seeds and barks); 4th Weighing of the fruits (edible weight); 5th Measurement of the edible weight of the fruit portions that contain 14g of carbohydrates; 6th Measurement of the water content in the fruit portions that contain 14g of carbohydrates.

Results: Regarding the gross weight of melon, strawberry and papaya we obtained the following weights: 297g, 217g and 206g respectively and edible weight: 192g, 211g and 138g. Finally, the portion of fruit containing 14g of carbohydrate is 247g of melon, 265g of strawberries and 154g of papaya. Thus, the amount of water content in melon, strawberry and papaya was 227g, 239g and 136g, respectively.

Conclusion: Assuming that the hydration capacity is proportional to the water quantity, we concluded that strawberries have the highest hydration capacity, followed by melon and papaya, when considering the portion necessary to make 14g of carbohydrates. However, the Food Composition Table of the Dr. Ricardo Jorge Institute provides the water content per 100g of fruit, where the melon presents greater capacity of hydration. In addition, it was verified that a portion of fruit (160g) does not necessarily makes up 14g of carbohydrates, since each fruit has different amounts of carbohydrates in its composition.

Keywords: Water, Carbohydrates, Melon, Strawberry, Papaya

A LOOK AT: STRAWBERRY, KIWI, MANGO – RICH SOURCES OF FOLATES

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Background: According to the Portuguese Food wheel, 3-5 portions of fruit should be eaten everyday. Strawberry stands out by its richness in vitamin C and potassium as well as the kiwi, which is also rich in fiber. Mango is a good source of vitamin A and caroten.

The goal is to study these fruits in concerns to carbohydrates and folates, an abundant nutrient in all of them, very important on the amino acids and nucleic acids metabolism, and also on the formation of blood cells and some of the constituents of nervous tissue.

Methods: Each fruit was prepared and weighted and then, the edible part, containing 14g of carbohydrates, equivalent to 1 portion, was determined as well as also the amount of folates each portion had, based on INSA table.

Results: The edible part, concerning to one portion (14g of carbohydrates) of strawberries, kiwis and mangos is 264g, 128g and 120g, respectively. In terms of folates, this measures up to 124µg (strawberries), 54µg (kiwis) and 43µg (mangos). These values of the edible part are the same, in gross weight, for 275g of strawberries, 159g of kiwis and 158g of mangos.

Conclusion: In summary, to one portion of fruit equals 9 strawberries, half a mango and 2 kiwis. By this fact we conclude that to a portion of 14g of carbohydrates, strawberry offers a larger amount of fruit than mango and kiwi.

The recommendations for folates are 400µg a day, so only three fruits per day don't provide the amount recommended.

Keywords: Strawberry, Kiwi, Mango, Folates, Carbohydrates

TROPICAL FRUITS: A SHOT FOR YOUR HEALTH

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Background: Tropical fruits, like papaya, pineapple and mango, are rich in vitamin C, potassium, fiber and water. While pineapple has manganese, papaya is a good source of carotenes, flavonoids and folic acid and, like the mango, of vitamin A. With the obtained results, a critical review will be made on the Portuguese food wheel guide that considers 160g of fruit a portion.

Methods: The fruits were weighed in whole, then cut and peeled to obtain the edible weight. The edible weight and gross weight corresponding to 14 grams of carbohydrates was calculated.

Results: The mango is the largest energetic supplier and has the lowest values in water. In 100g of edible weight, this fruit presents on average 62.3kcal and 83g of water, as opposed to papaya with 39kcal and 88.2g of water. The pineapple, being in between, has 48 kcal and 86.3 g of water. To achieve the amount of carbohydrates equivalent to a portion of fruit, it would be necessary to consume about 120g of mango, 146g of pineapple and about 153g of papaya, that is, respectively 176g, 214g and 243g of gross weight.

Conclusion: The amount of fruit needed to obtain 14g of carbohydrates is, in all them, superior to the 160g recommended for a portion. Possibly, the high water content of these fruits makes it necessary to eat a larger amount to reach the desired carbohydrate value. It's very usual to think that a portion is a piece of fruit, which doesn't always correspond to reality.

Keywords: Tropical fruits, Papaya, Mango, Pineapple, Nutritional value

SEASONAL FRUITS

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Background: Fruits provide us minerals, vitamins, protective compounds and fibers. They play a key role in healthy habits, that must be included in our life.

The aim of this project was to determine the edible and gross weight for each fruit that was needed to achieve 14g of carbohydrates.

Material & Methods: We weighed the fruits. Apple and pear: they were cut into quarters, the seeds were removed and then weighed. After that, they were peeled and weighed again. Orange: We peeled and weighed it. We calculated the edible and gross weight that was needed to achieve 14 grams of carbohydrates for each fruit and the amount of carbohydrates that each piece of fruit contained.

Results: We determined that the weight for each fruit containing 14g of carbohydrates was: Pear: 149g; Apple: 110g; Orange: 157g. Then, we calculated the gross weight for each fruit containing 14g of carbohydrates: Pear: 191g; Apple: 138g; Orange: 228g. Because of its micronutrients orange is a good source of vitamin C, calcium, magnesium and potassium. In its turn, an apple is a good source of vitamins A, C, E and B9, pectin and quercetin, while a pear is rich in beta-carotene and water.

Conclusion: According to the Portuguese Food Wheel a portion of fruit contains 14 g of carbohydrates, and taking into account the values of the Food Composition Table, an orange, an apple and a pear have to weigh, respectively, 157g, 110g and 149g.

Therefore, we conclude that a portion is not necessarily a piece of fruit, we have to take into account their weight, as well as the type of fruit we are dealing with.

Keywords: Fruit, Vitamins, Edible Weight, Portion, Carbohydrates

SWEETEN YOUR LIFE WITH FRUIT. IT'S SIMPLE.

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Background: The apple, the grape and the clementine have in common the content of carbohydrates that varies from 10% to 20%. The carbohydrates are classified in complexes (constituted by long chains of sugar, being slowly absorbed) or simple (constituted by one or two simple sugars, they are readily absorbed in our organism and they exist, essentially, in fruit (fructose), in milk (lactose) and in common sugar (sucrose).

Methods: Through weighing, use of formulas and using the Food Composition Table it was possible to achieve the true value of a portion of fruit that corresponds to 14 grams of carbohydrates.

Results: In order to make a portion that contains 14 grams of carbohydrates, an apple must have about 110 grams, a grape about 75 grams and a clementine must have 126 grams. These values are very different between them, so we can't define exactly a portion. The Food Wheel says that one portion corresponds to 160 grams and these results don't match with this definition.

Discussion and Conclusion: None of these fruits satisfy the concept of which a portion of fruit corresponds to 160 grams, since this amount in reality corresponds, for example, to two portions of grape.

In the context of a healthy eating, we must privilege the consumption of complexes carbohydrates to the detriment of the simple. However in that same balanced regimen, should exist a daily consumption of fruit between 3 and 5 portions, where 1 portion corresponds to 160 grams according to Food Wheel.

Keywords: Carbohydrates, Apple, Clementine, Grape, Healthy eating

CAROTENES IN COLORFUL TWINS (MELON, PAPAYA AND MANGO)

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Background: Fruit is fundamental in our diet and it should be consumed daily. It's a source of vitamins, minerals, fibers and antioxidants, which protect our cells against free radicals. In this work, we pretend to analyze the beta carotene and carbohydrate content in three types of fruit.

Methods: The fruit was initially weighted (gross weight), then was washed, peeled and cut (edible weight) and after that was weighted again. Hereafter, we made the necessary adjustments in order to reach the 14g of Carbohydrates, and also we use the Food Composition Table to make the calculations. The determination of beta carotene content was not performed in class, but the methods used were identical.

Results: Currently, the Portuguese Wheel of Food recommends a daily consumption of 3 to 5 servings of fruit (each serving must have 14g of Carbohydrates). One portion corresponds to 120g of mango, 150g of papaya or 245g of melon (of edible weight). Regarding to carotenes, per 100g, Mango has 1800µg, Melon 1000µg and Papaya 810µg. Each portion of mango has 2142µg, papaya has 1255,5µg and melon has 250µg, of carotene.

Discussion and Conclusion: After a critical review, we conclude that, on the fruits analyzed, mango has a higher content of carbohydrates, as well as beta-carotene, and melon has the lower content of both. However, we must adopt a varied diet, favoring always the fruit of the season

Keywords: Mango, Papaya, Melon, Carotenes, Fruit, Portion

FRUIT – A SOURCE OF FIBER (BANANA, MANGO AND PAPAYA)

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Background: Dietary fiber (DF) is an indigestible carbohydrate (CH), in plant derived foods and it's essential for the proper digestive functioning; reduces the absorption of fats and cholesterol; helps preventing some oncological and cardiovascular diseases and is associated with satiety.

Banana, mango and papaya are tropical fruits, abundant in CH and soluble fiber (SF). Banana is rich in potassium and tryptophan; mango and papaya are excellent sources of vitamin C and phytonutrients, such as beta-carotene (mango) and lutein (papaya), and papaya also contains papain (helper enzyme in digestion's process).

Methods: After preparing and weighting each fruit, we determined the edible part (EP) that had 14g of CH (1 portion) and also with that and the original weight, we calculated the %EP, as well as each portion's fiber amount - all based on INSA's data.

Results: The EP of the banana, mango and papaya per portion were 64g (35%), 120g (29%) and 154g (60%), respectively. This corresponds in terms of fiber to 2g (banana) and 3,5g (mango and papaya), since the amount of fiber per 100g is 3,1g; 2,9g and 2,3g, respectively.

Discussion and conclusion: We should eat at least 25g of fiber/day. Even if we have the recommended 3-5 fruit portions, in this case, that amount of fiber isn't met. Therefore, we have to resort to other fiber rich foods like oats, legumes and vegetables or, once our fruits %EP is small, choose, from this type of fruit, more rentable ones and that the peel (where a lot of the fiber is concentrated) is edible.

Keywords: Fruit, Banana, Mango, Papaya, Fiber

GREEN, YELLOW AND ORANGE, THE COLORS THAT GIVE JUICE TO YOUR LIFE: PEAR, PINEAPPLE AND ORANGE

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Background: Fruits must be included in our eating pattern due to their nutritional wealth and considering its preponderant role in our health. Over the years, nutritional science has substantially modified its recommendations, advising that the basis of our alimentation should consist in carbohydrates. Carbohydrates are the main source of energy, and also a significant part of the fruit.

Methods: We determined the in natura weight and edible weight (devoid of inedible parts), calculated the amount of carbohydrates and made corrections to the edible weights found, in order to obtain the quantities indicated in the Food Wheel Guide.

Results: One portion of Pear corresponds to 148,9 grams; Orange 157,3 grams; Pineapple 147,4 grams. Concerning the content in carbohydrates, per 100 grams of edible weight, Orange contains 8,9 grams, Pear presents 9,4 grams, and Pineapple 9,5 grams.

Discussion and Conclusion: Pear is a fruit rich in vitamin A, C, B1, B2, B3, sodium and iron. Vitamin A promotes visual and reproductive functions, the repair and maintenance of tissues such as skin and bones. Orange is a great source of citric acid, which enhances the action of vitamin C, interesting to our cardiovascular health. Pineapple is a citric fruit, an excellent source of carbohydrates and fibre and helps decreasing blood pressure. These fruits contain 5 to 10% of carbohydrates, according to INSA. The Food Wheel demands the consumption of 3 to 5 portions of fruit, daily. 1 Pear + 1 Orange + 1 slice of Pineapple ensures the recommended daily allowances (51 g). One portion of fruit equals one pear, $\frac{3}{4}$ of orange and 1 slice and a half of pineapple.

Keywords: Carbohydrates, Edible Weight, Fruits, Portion of Fruit, Recommendations

IF YOU NEED POTASSIUM: BANANA, KIWI AND MELON

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Background: Kiwi, banana and melon are fruits with nutritional interest and should be consumed regularly, depending on their seasonality. Kiwi is a good source of vitamins (vitamin C) and minerals (potassium) and is also rich in fiber and water. Banana is rich in carbohydrates, minerals (potassium and magnesium), vitamins (folic acid and vitamin B6) and fiber. Melon is mainly composed of water, having low energy and a high content of fiber, vitamin C, carotene and potassium.

The objective of this study is to compare the amount of potassium of these three fruits.

Methods: To carry out this study, we based on a practical class protocol in which we peeled, weighed and photographed the fruit. Our purpose was to obtain the gross and the edible weight and determine the quantity of each fruit that corresponds to a portion (14 g of Carbohydrates). We have calculated the quantity of potassium for each portion of fruit.

Results: A portion of kiwi corresponds to approximately 128gr of edible weight, a portion of banana corresponds to 64 g and a melon corresponds to 246 g. One portion of melon contains 0.6 g of potassium, while a banana contains 0.3 g and a kiwi 0, 4 g.

Discussion and Conclusion: In summary, a portion of melon contains more potassium than the other fruits, because a portion of melon corresponds to a much higher fruit amount due to its water content. According to the DRI (Dietary Reference Intakes) reports, the daily amount of potassium recommend is 2 g, so we concluded that it would take 4 portions of these fruits to obtain the necessary amount of this nutrient, which is in line with the recommendations of daily fruit intake from the Food Wheel. Nevertheless, it is common knowledge that a varied diet is necessary, and other fruits and vegetables can also be valuable sources of potassium.

Keywords: Potassium, Banana, Kiwi, Melon, Portion

X-RAYS EFFECTS IN A BLADDER CANCER CELL LINE

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Cancer is the set of diseases that have in common the loss of cellular proliferation control. Bladder cancer (BC) is the ninth most frequently diagnosed cancer worldwide being the eighth most common in Portugal. The urothelial carcinoma represents 90% of the bladder tumours and has two sub-categories: superficial (nonmuscle invasive) and muscle invasive forms.

The aim of this work is to study the model of aggression after radiation exposure to determine and characterise the effects of ionising radiation in a BC cell line.

In order to achieve these aims will be used a bladder cell line that will be irradiated with several X-ray doses. Viability and proliferation are studied using the Trypan Blue method, the clonogenic assay and the ki67 index. Trypan blue is a dye exclusion test that is used to determine the amount of live and dead cells; the clonogenic assay allows us to evaluate the final result of the radiation-induced cellular aggression and Ki-67 is one of the prime biomarkers that reflects cell proliferation. Cell death was assessed by double staining assay with Annexin V/Propidium Iodide – Flow Cytometry technique and also by evaluating morphological characteristics using optical microscopy after staining of the cells with May-Grünwald Giemsa medium.

Keywords: Bladder; Carcinoma; cell culture; radiotherapy

TUMOR NECROSIS FACTOR A BLOCKADE EFFECTS IN CHRON'S DISEASE TREATMENT***Diana Serra***

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Crohn's disease (CD) is a chronic intestinal inflammatory disease that affects any part of the gastrointestinal tract. Studies have found one exacerbated response of the immune system and aberrant recognition by toll-like receptor (TLR) in this patients. TLR 4 and TLR 2 are the main TLR in the bowel. It has been shown that tumour necrosis factor-alpha (TNF- α) is increased in the bowel tissue and it has been performed studies recently studying the increase in stool too. The therapy with Infliximab is an antibody against TNF- α that keeps the disease stabilised.

The aim of our studies was to analysis the expression of white blood cells (WBC) and TNF- α in blood, the expression of TLR-2, TLR-4 and the TNF- α in tissue and quantify TNF- α in stools. These characteristics will be studied between three populations: healthy people, patients with CD activated in the ileum (CD-activate) and patients treated with Infliximab (CD-IFX).

For each population, one sample of stool and other of peripheral blood in ethylenediaminetetraacetic acid thipotassium will be collected. Two biopsy specimens will be obtained from CD-activate, two from CD-IFX and two from uninfamed tissue, all from the ileum part.

Automated haematology analyses and flow cytometry (FC) will be used for study WBC and subpopulations of WBC, respectively. FC will be used to quantify the expression of TNF- α in blood. We will appeal to immunohistochemically staining for quantifying TNF- α , TLR-2 and TLR-4 in tissue. Finally, the sandwich enzyme-lined immunoassay technique will be used for quantifying the faecal TNF- α .

Keywords: Chron's Disease; tumor necrosis factor-alpha; immune system; toll like receptor; infliximab

ESOPHAGUS ADENOCARCINOMA AN IN VITRO STUDY OF IONISING RADIATION EFFECTS

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Esophageal cancer (EC) is the sixth leading cause of cancer death worldwide. The two most common EC histotypes are Esophageal squamous cell carcinoma (ESCC) and Esophageal adenocarcinoma (EAC). EAC affects mainly caucasian men and usually occurring in the distal esophagus. There are several risk factors for EAC, but the most important one is Barrett's esophagus, associate to chronic Gastroesophageal Reflux Disease. There are several treatments available such as Endoscopic Therapy, Chemotherapy, Radiotherapy, Photodynamic Therapy, and Esophagectomy.

The aim of the study is to evaluate the radiation effects on the cell line of EC, namely viability and cell proliferation, to establish survival factor and characterie cellular death type. Cell suspensions will be exposed to single-shot doses of X-radiation, with a range of doses from 0.5 Gy to 12.0 Gy. In the evaluation of cell proliferation and viability, the trypan blue assay was used at different times and the clonogenic assay to determine survival factor and plate efficiency. Flow Cytometry was used to characterie cell death type, using double labeling with annexin V and propidium iodide, as well as the staining of cells with May-Grunwald Giemsa. The determination of KI67 expression index is performed by Immunohistochemistry with the purpose of quantifying the proliferative activity of the esophagus adenocarcinoma cells.

Keywords: Esophageal cancer; radiotherapy; ionising radiation; Ki67 antigen; cell death.

EFFECTS OF IONIZING RADIATION IN AN OSTEOSARCOMA CELL LINE

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Osteosarcoma is the most frequent bone tumour, and this bone sarcoma is usually observed in the metaphyseal region of long bones (distal femur and proximal tibia) of children and young adults. Its highest incidence occurs during the adolescence and the cases of osteosarcoma decrease with the age increasing. Studies have shown a correlation between the rapid bone growth during puberty and the occurrence of osteosarcoma, which is proven given that the incidence of osteosarcoma is higher during puberty.

Cell lines represent in vitro models that allow the study of cell response to radiation. The MNNG/HOS cell line will be irradiated with x-ray at different doses in a linear x-ray accelerator. Recurring to different methods will be possible evaluate the cell aggression induced by the radiation. The cell viability will be determinate by the trypan blue exclusion method. The plate efficiency and the survival factor will be calculated through clonogenic assay. The marking by the Ki67 protein will be used to evaluate cells proliferation. The May-Grünwald Giemsa allows the observation of the cell morphology. Lastly, the type of cell death is characterised by double tagging with annexin V and propidium iodide.

Keywords: Osteosarcoma; cell line; radiotherapy; cell death; ionising radiation

EVALUATION OF RADIATION EFFECTS ON A HUMAN RETINOBLASTOMA CELL LINE

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Retinoblastoma (RB) is the most common intraocular cancer in childhood representing 4% of all paediatric malignancies. RB is an embryonic neoplasm of retinal origin developing after the loss, inactivation, mutation or alterations in both copies of RB1 gene. The diagnosis of RB is based on an ophthalmologist examination and imaging studies. There are many therapeutic options available and radiotherapy is a mean of preserving vision in children with RB since the tumour is radiosensitive.

To evaluate cell survival and viability we used the following assays: clonogenic, Trypan Blue and Ki67 expression, regarding type of cell death we used cellular morphology and flow cytometry.

The clonogenic assay determines cell survival and estimation about cell viability. This assay evaluates the result of radiation-induced cellular aggression and determines lethal dose 50. Trypan Blue Assay is an exclusion method based on the principle that viable cells, are impermeable to this dye and therefore remain clear and/or bright. Through Ki67 expression by immunohistochemistry, we are able to quantify the proliferative activity of Y79 cell line. The assessment of cell death type was performed using the morphological characteristics, after cell staining with May-Grünwald Giemsa using optical microscopy as well as with flow cytometry with double staining with annexin V and propidium iodide to differentiate the cells between viable, in apoptosis or necrosis.

The aim of this study is to determine the survival of RB cell line (Y79) at different endpoints after irradiation with a linear accelerator by X-rays.

Keywords: Retinoblastoma, radiotherapy, radiosensitivity, clonogenic assay, cell death

HAM, TECHNOLOGICAL PROCESS: FROM RAW MATERIAL TO CONSUMER

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BACKGROUND: The ham is a product made from pork or poultry, brine, which is subjected to heat treatment.

AIM: The choice of ham consisted of being a product with great demand, acceptability and much consumed, in Portugal and throughout Europe. It's intended to understand the whole process that takes place between the reception of the raw material (pork) and the arrival to the consumer in the form of ham, as well as to analyze the benefits and disadvantages of this transformation.

MATERIAL & METHODS: For the collection of information, we researched 5 articles published between 2010 and 2014 on the scientific bases (Pubmed and Google Scholar), theses and information of a Portuguese factory of production of ham.

RESULTS: The technological process of the ham consists of the following phases: reception of the raw material, boning and cleaning, injection of brine, massage, shaping, baking, fast cooling and packaging is closed in a vacuum. The time between the beginning and the end of the process is approximately 3 days.

CONCLUSION: In their processing, the ham is subjected to a heat treatment, preservatives are added and the packaging these processes reduce the risk of proliferation of microorganisms harmful to consumers' health compared to the raw material from which they originate.

In terms of nutritional changes, compared to raw pork ham has higher energy, more fatty acids and sodium. On the other hand, there is a decrease in water.

Ham is a nutritionally interesting product, being a food that can be consumed by the majority of the population in adequate amounts.

Keywords: Ham; technological process; ham production; food technology

SAUSAGE PRODUCTION STAGES

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BACKGROUND: The sausages belong to the group of industrialized products, having in their constitution mechanically separated meat (MSM), condiments and additives, their target population is the population in general and the population with less economic possibilities, because it is a cheap product. The mechanically separated meat composition depends on the raw material, however it is generally high in lipid content and is composed of muscle, connective and adipose tissues.

AIM: The production process of the sausages consists of 10 stages: Meat preparation, Weighing, Grinding and breaking of blocks, Grinding, Inlaying, Cooking, Cooling, Cooling in cold room, Packing and Storage. The sausages are a product without great nutritional interest, since their amount of fat and energy density are very high.

MATERIAL & METHODS: A research of scientific articles was conducted through the Google Academic, PubMed and Scielo databases. We researched about 15 articles between 2005 and 2017.

RESULTS: MSM will later be used, along with the other ingredients and the preparation of pasta, in the production of sausages. We must reduce the consumption of these processed products and favor their raw material, the meat that has the best nutritional characteristics, without adding salt, fat, preservatives and other added chemicals to improve the taste and texture.

CONCLUSION: Meat processed when in excess and associated with a sedentary lifestyle, can lead to the emergence of Non-communicable Chronic Diseases (NCCD). One of the major problems of processed meat products is the high salt and fat content, and it is possible to reduce sodium content by replacing it with potassium chloride.

Keywords: “Sausages, Mechanically Separated Meat, Production Stages” and “Industrialized Products”.

KETCHUP PROCESSING

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Tomato (*Lycopersicon esculentum*) is a ubiquitous and highly important vegetable crop around the world, whose fruits are widely consumed and are a source of vitamin C, carotenoids, folate, and potassium, and other antioxidant compounds. It plays an important role in human health as a rich source of lycopene, which is used for cancer treatments. Its by-products are also very consumed, as is the case of ketchup, a product in increasing and excessive consumption.

It is the aim of this work to analyse the ketchup production process and compare its nutritional characteristics with the product in nature that originates it, the tomato.

In the bibliographic search, we used the electronic databases Scielo, PubMed and the Scholar Google search engine. Of the 15 articles surveyed, resulted a selection of 10 articles of greatest interest, which were published from 2007 to 2017.

There are about 22 steps in the ketchup processing, where homogenization, pasteurization, cooling, and packaging are the unit operations that are interconnected in order to create the process as a whole. The quantities of the ingredients, as well as the types of spices added to the pulp, depend on the industry concerned.

In comparison with its main raw material, ketchup has higher caloric value and there are significant losses of micronutrients during its processing, mainly of vitamin C and folate. Furthermore, as ketchup is a processed product, with the addition of salt, sugar and other nutritionally uninteresting compounds, its consumption is not a part of a healthy dietary pattern.

Keywords: Tomato, ketchup, processing

FOOD PROCESSING: PEAR NECTAR vs RAW PEAR***Carolina Reis, Daniela Couto, Joana Tomás, Patrícia Moreira****Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Portugal*

Pears contain more than 80% water and a great amount of fiber, vitamins and minerals, as well as carbohydrates. Most pears are grown for direct consumption, however, fruits that do not meet the standards required for commercialization, but that are in great condition, serve to obtain industrially processed products, such as juices and nectars. Consequently, a variety of things can happen during the process that can affect its nutritional content.

Therefore, this review aims to provide concise information on all the processes involved in the production of the Pear Nectar, as well as the influence of various food-processing operations on the health benefits of fruits and their nutritional value.

A systematic review of the literature was conducted in the Scielo, Science Direct and Scholar Google databases. It was found 15 articles of interest published between 2006 and 2017, with 5 of them were selected.

The process of production includes two main phases: the transformation of the fruit to obtain puree (harvest, reception, storage, washing, selection, crushing, preheating, standardization, deaeration, pasteurization and aseptic filling,) and the preparation and filling of the nectar.

In summary, the nutritional value of nectars depends mainly on the type of fruit used, the processing methods and the degree of dilution. It is known that part of the fiber and vitamins are lost, and its caloric value is higher due to the addition of sugar. Even though, raw fruits provide more nutritional benefits, the punctual consumption of nectars can be part of a balanced and varied diet.

Keywords: Fruit; Nectar; Juice; Pear; Food processing; Nutrition**References:**

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MARIA BISCUIT: FROM ITS COMPONENTS TO THE CONSUMER

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Bakery products form an important part of the food industry worldwide. Biscuits, in particular, are very attractive products because of their long shelf-life and wide variety. The main ingredients for manufacturing biscuits are wheat flour, fat, sugar and leavening agent. Biscuits can be classified according to taste (sweet, semi-sweet and salt biscuit) and/or dough (soft and hard dough biscuit and crackers). As an example of a hard sweet biscuit we have Maria Biscuit.

This work explores the manufacturing process of Maria Biscuits, from its raw ingredients until the final packaging.

The first step is the mixing of the ingredients to form dough, followed by sheeting in which uniform sheets are obtained from the dough by the application of continuous compressive force and by forming the biscuits. During the forming the doughs are forced into the mold to obtain the planned shape. After that it is stamped the name of the biscuit into his surface. The next step is baking, traditionally on steel bands and between 5/7 minutes. Once the baking process ends, the Maria Biscuits are cooled. Leaving the cooling conveyor they enter directly in the packaging zone, a critical step for any food safety product. To avoid most common hazards it's necessary to control each step of the process, analyze the organization and document the Critical Control Points.

Most bakery products incorporate several nutritionally rich ingredients. However, sweet biscuits are typically high in fat and sugar. Consequently, they're recommend only in small quantities as part of a varied diet.

Keywords: Maria biscuit, hard sweet biscuit, manufacture

PROCESSES USED IN THE PRODUCTION OF BOVINE MILK SERUM PROTEIN

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BACKGROUND: Whey Protein (WP) is a byproduct of cheese or milk and can be defined as a mixture of globular proteins that remain soluble after precipitation of casein at a temperature of 20°C and pH 4.6. Whey can be obtained from different ways; the most common are acidification and enzymatic coagulation. Depending of the process of whey production, we can obtain two types of WP: - the whey protein concentrate (WPC) and the whey protein isolate (WPI). Whey Protein, to be considered Concentrate must have a protein concentration of 35-85% while WPI must to have $\geq 90\%$.

AIM: Understand the main unit processes from whole milk to its by-product WP powder, as well as the differences between WPC and WPI.

MATERIALS & METHODS: A systematic review of the literature was conducted using the Google search engine as well as the reading of several scientific articles. The articles of greatest interest have been published between 2005 and 2015.

RESULTS: The obtained results for WPC are: 80-82% protein, 4-8% lactose, 4-8% lipids, 3-4% ash and 3.5-4.5 moisture. For WPI these are; 90-92% protein, 0.5-1% lactose, 0.5-1% lipids, 2-3% ash and 4,5% moisture.

CONCLUSION: Due to the variation of values obtained, WPC is preferable for those who want to boost the immune system, since it contains more bovine serum albumin that is rich in gamma-glutamylcysteine. WPI is more beneficial for a greater muscle protein synthesis, since it contains more l-leucine, an mTOR signaling pathway activator.

Keywords: Whey protein; protein fractions; technological processes; microfiltration; ultrafiltration; Pasteurization.

PROCESSING OF POTATOES INTO CHIPS

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The term chips is originally American and refers to thin slices of potato chips fried in oil or fat. The objective of this work is to understand how the processing of this type of product occurs and if during processing there are any nutritional losses, losses of raw product (waste) and changes in the nutritional composition of the final product in relation to the raw product. In addition, one of the objectives is to understand whether this food has an interest in a balanced and healthy diet. The elaboration of this work was based on the research of scientific articles in online platforms such as Research Gate and Scielo (Found three relevant scientific articles since the year 2000). Frying is a combined cooking and drying process whereby you get products with low residual water content in a few seconds or minutes. The main stages of processing potato chips are product selection (potato), washing and peeling, Inspection, cutting, removing excess water before frying, frying, inspection of the frying, flavouring, packaging and storage. These kind of products undergo changes in its composition (improvements) so that its flavour and consistency become extremely additive. The packaged potatoes are nutrient-poor, high-calorie foods, which are rich in salt and trans fatty acids. It is important to avoid consumption of chips because they are cut so thin and fried at such high temperatures that they undergo chemical reactions and release Acrylamide, a potentially carcinogenic substance. In addition they have other nutritional factors that make it a food that carries too many risks for human health.

Keywords: Potatoes, Chips, Processing, Food, Technology

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PRODUCTION OF THE SERRA DA ESTRELA CHEESE

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The Serra da Estrela cheese is a Portuguese cheese made with sheep's milk. The earliest mentions of this cheese are dated to the 12th century, naming it the oldest of Portuguese cheeses. The aim of this work is the demystification of the process of production of the Serra da Estrela cheese.

A research was carried out using the book entitled "The Great Book of Serra da Estrela Cheese". There were also seen some stories about the subject and a visit was made to a similar industry. Industrialized food results from the transformation of non-processed food through industrial processes. So, it's possible to execute a flowchart of the Serra da Estrela cheese processing. This process begins with milking, but the sheep must be from a purebred and from the region. Then, the milk is filtered and heated. With temperature increasing, salt and thistle are added. Next, the milk will be curdled, being stopped and some serum removed. The following processes are dehydration and moulding, followed by placing the cheese into a press to remove the remaining whey. The next step is maturation or cure. To finish, the cheese is certified, labelled and marketed.

There are some nutritional differences between the sheep's milk and the final product. All macronutrients and sodium have a higher value in the cheese, but it's important to highlight the clear difference in lipids that increases expressively the number of calories per portion.

The process of creating Serra da Estrela cheese has several stages, resulting in a very appreciated product by the Portuguese population.

Keywords: "industrialized product", "Serra da Estrela cheese", "food", "milk"

THE MANUFACTURING PROCESS OF THE CHOCOLATE BAR

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Chocolate is obtained from the mixture between cocoa, the main raw material of chocolate, made by roasting and grinding its dry grains and sugar. Most industries get the cocoa butter ready, and begin their process in the mixing step. The cacao suffers several transformations to be able to be used, since the drying, cleaning, roasting and peeling of the grains, followed by their grinding and pressing. The process is finished by transforming the cocoa into chocolate, giving the refining stage and the shell. Finally the chocolate is tempered, mixed and shaped so as to form the tablet form.

Given the enormous popularity of chocolate, this paper intends to review the literature about the various stages of processing that the chocolate tablet undergoes, in order to understand the reasons why it is one of the most wanted and consumed products. Moreover, we intend to inform about the different types of tablet chocolate and its different benefits or harms, as well as the power of the industry of this product, from the manufacture to sale and promotion.

To reach the proposed goal, a research was done in the platforms B-ON, Scholar Google and PUBMED. For this purpose, the following keywords were used, isolated or combined: processing, chocolate and manufacturing, having as inclusion criteria the literature in the period between 2007-2017.

The long preservation and storage capacity of chocolate results from its processing, namely the drying and mixing of ingredients such as sugar. A high concentration of sugar prevents growth of microorganisms and consequent deterioration of the chocolate. Chocolate begins with an interesting raw material (cocoa) however due its enormous processing it ends up losing its main nutritional properties.

After this bibliographical review, it is verified that chocolate is a product present in the daily life of any human being and its use has been increasing, as well as in industries of the most diverse areas and in the most diverse forms.

Keywords: Processing, Chocolate, Manufacturing

NUTELLA: SWEET OR SIN?

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BACKGROUND: Nutella is a hazelnut and cocoa spread best seller in the world produced by Ferrero. The commercial advertising gives consumers the idea that Nutella is a family-friendly product and while it has a high sugar and fat content, emphasis is placed on Nutella's all natural ingredients, with no additives or coloring.

AIM: Discriminate the raw materials used in Nutella's production and understand how it's processed and distributed through the world. We also pretend to explore the labels and some marketing strategies used by the manufacturers as well as analyze how safe is the consumption of this product.

MATERIAL & METHODS: As a method of data collection we used online platforms such as Google and Google Scholar. Were selected three articles between 2010 and 2017.

RESULTS: As main ingredients Ferrero uses sugar, palm oil, hazelnuts, cocoa and whey powder on Nutella's production. The unique taste and texture of Nutella are given by the way these ingredients are mixed in terms of proportion and temperature. In addition to soy lecithin - a stabilizer - vegetable oils also play a crucial role on the smoothness of Nutella. Nevertheless, this is a product without any nutritional interest mainly because of its large amount of sugar and fat.

CONCLUSION: According European Food Safety Authority (EFSA), when refined at around 200 degrees Celsius, palm oil, an ingredient of Nutella, releases a contaminant that may cause cancer. However, this organization did not recommend consumers stop eating palm oil yet.

Keywords: Nutella, raw materials, processed, flavour, palm oil

METABOLIC PERSPECTIVE OF PHYSICAL EXERCISE

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During workout, there is an increase in the body's energy needs to maintain muscular activity. There are several ways of supplying energy in different situations. For that, our body has stored different energetic substrates like carbohydrates, fats and proteins.

The first line substrates are carbohydrates, instead of fats, since the metabolic pathway in which they're used (anaerobic lactic metabolism and aerobic metabolism) is faster at ATP production. Even more efficient is the PCr system in which the supply of ATP is almost immediate.

The rapid energy supply pathways, known as anaerobic alactic (for PCr) and lactic (for Carbohydrates), are used when physical activity starts, providing a lot of energy, but only for a few seconds, like when you're sprinting or jumping, so they're accurate for fast and high intensity workouts, but since they run out so quickly, our body starts to use another way to get energy, the aerobic pathway. It supplies energy more slowly - a feature of long-term and low-intensity activities like a marathon or simply something that takes more than 5 minutes.

When we exercise, all of the metabolic pathways are used at the same time, but one of them are going to be more requested than the others.

The intensity and duration of the effort, as well as the initial state of energy will interfere in the predominance of the contribution of a metabolic pathway. Resulting in different reactions to the exercise and performance results.

Keywords: workout, substrate, metabolism, aerobic, anaerobic, intensity

IMPACT OF NITROSAMINES ON CARCINOGENESIS AT THE DIGESTIVE SYSTEM LEVEL***Neuza Oliveira, Cristina Girão****Instituto Politécnico de Coimbra, ESTESC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Portugal*

Nitrosamines are organic compounds, potentially carcinogenic, which may form as a reaction product between amines by combining these with nitrites, a so-called nitrosation reaction. Endogenous formation also consists of an important source of these compounds and may be formed by activated bacteria or macrophages that catalyze the union of the above compounds. Human exposure to nitrosamines may occur as a consequence of some habits, such as smoking, but mainly through food, and the processing to which foods are subject influences the amount of nitrosamines formed.

Virtually all organs are amenable to induction of tumors by nitrosamines, depending on the chemical structure of the N-nitroso compound, dose and route of exposure, the esophagus, liver and stomach being the most affected organs.

Nitrosamines are pre-carcinogenic, only after a biotransformation reaction they result in final carcinogens, which will react with the DNA. This step involves the cytochrome P450 forming highly reactive compounds. They cannot escape where they are formed, reacting with various macromolecules, including DNA. It is known that the action of diethylnitrosamine, final carcinogenic, among other N-nitrosamines require activation by the cytochrome P450 isoenzyme that can be found in the liver and esophagus, hence the susceptibility of these organs to the action of nitrosamines.

In conclusion, cytochrome P450 plays a major role in the biotransformation of N-nitrosamines into final carcinogenic in the target organs of study. Nitrosamines are genotoxic substances, which have a high carcinogenic potential.

Keywords: N-Nitrosamines; cytochrome P450; Cancer

PHOTODYNAMIC THERAPY

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Photodynamic therapy (PDT) has been a treatment of great clinical interest since the beginning of the 20th century, appearing as an alternative therapeutic in the treatment of several types of cancer. Its increasing therapeutic use is due to the low aggressiveness, the possibility of prolonged use without cumulative toxicity and the reduced long-term morbidity associated with a substantial improvement of patients' quality life.

It is particularly useful in the treatment of superficial or shallower lesions taking into account the optical penetration of light. It depends on three essential components, the photosensitizer, which selectively acts on the tumor tissue, the red light of the visible spectrum, emitted by a laser, with a wavelength that fits the absorption spectrum of the photosensitizer and the availability of oxygen in the tissues.

The reaction resulting from the interaction between the visible light spectrum and the photosensitizing agent, in the presence of oxygen, triggers photophysical and biological processes that result in the formation of reactive oxygen species capable of attacking cellular constituents and causing tumor tissue death.

Cell death associated with PDT may occur through apoptosis, necrosis or autophagy, but apoptosis is considered the predominant pathway. In most of the models that have been studied, apoptotic cell death following PDT essentially involves the mitochondrial pathway.

Its great advantage is the photobiological reactions are restricted to the site of accumulation of the photosensitizer agent and its selectivity of action in the tumor tissue.

Keywords: Photodynamic therapy, photosensitizer; Apoptosis

CRISPR/Cas9: GENOME EDITING TECHNIQUE***Diana Lopes, Cristina Girão****Instituto Politécnico de Coimbra, ESTESC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Portugal*

CRISPR/Cas system uses CRISPR RNAs (crRNAs) to guide Cas nuclease to silence invading nucleic acids, is self-defense system against exogenous virus or plasmid in bacteria and archaea. Actually, there are three types of CRISPR/Cas system identified: types I, II and III. In the type II CRISPR/Cas9 system, short segments of foreign DNA termed “spacers” are integrated within the CRISPR genomic loci, transcribed and processed into crRNA. This technology consists of two phases: transcription of the CRISPR locus that results in short fragments of RNA capable of recognizing a specific exogenous DNA and acts as a guide to a particular site in the genome, the Cas9 protein that cleaves the DNA in this location.

Once the CRISPR/Cas9 technology is a RNA-mediated immune system that has made great strides in science, scientists don't use this system only to act as a pair of molecular scissors to precisely cut or edit specific sections of DNA, but recently to manipulate CRISPR/Cas9 variants with the goal of reversibly controlling activated or deactivated genes. Thus, this technique can undoubtedly be a tool in aiding diagnosis and oncological treatments or even prevent cancer.

The main goal of this work is to cognize and to characterize one of the new genome editing technologies.

Keywords: CRISPR/Cas9, genome editing technique**References:**

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CHANGES IN THE HUMAN MOVEMENT SYSTEM IN A SUBJECT WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Chronic Obstructive Pulmonary Disease (COPD) remains a serious public health problem. It is characterized by persistent obstruction that is usually progressive and associated with a chronic inflammatory response enhanced in the airways and lungs to noxious particles or gases. Exacerbations and comorbidities contribute to overall severity in patients. It is typically characterized as an avoidable and treatable disease state described by an airflow restriction which is not fully reversible. COPD has traditionally been considered a disease that mainly affects the lungs. Its systemic effects have been increasingly recognized with various manifestations involving the other body systems. It has also been considered as a disease affecting older people but can affect the working age population. There are two main forms of COPD. Most people with COPD have a combination of these conditions: chronic bronchitis, which involves prolonged coughing with mucus, and emphysema, which involves the destruction of the lungs over time. The prevalence of the disease indicates that about 15 to 25% of adults aged 40 years or older may have airflow limitations and that the prevalence of COPD is significantly higher in smokers and ex-smokers than in nonsmokers and higher in males than in females. In this study, we present the case of a subject diagnosed with COPD and the clinical reasoning that supports the proposed rehabilitation program.

Keywords: Differential diagnosis, Clinical Reasoning, Physiotherapy, COPD, Respiratory assessment

CLINICAL REASONING AND DIFFERENTIAL DIAGNOSIS IN THE CHRONIC INSTABILITY OF A RUNNER'S ANKLE SPRAIN: REHABILITATION PROGRAM FOR THE TRAIL PRACTICE

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Running is one of the most popular and common modalities in the world. (1,2) In Trail Running there are sudden changes of direction, different kinds of surfaces and slopes, that adding to fatigue challenge the articular stability, and is therefore associated to different injuries. (3,4) In spite of the injury incidence in Trail Running hasn't been studied, the cross-country characteristics are the most similar due to the variation and kind of surface, and the ankle sprain is one of the most common injuries, particularly in men. (5,6) The high recurrence of injuries, as well as residual changes are result of the ankle sprain in up to 54% of the individuals. (7) The most common residual impairments are the re-sprain, perceived instability and episodes of functional instability, joint laxity (or mechanical instability), pain, swelling, feeling of weakness and low level of physical activity. In this study, we present the case of a runner with an ankle sprain and the clinical reasoning that supports the proposed rehabilitation program for the trail practice. (7)

Keywords: Differential diagnosis, Clinical Reasoning, Physiotherapy, Trail Running; Ankle; Chronic Instability

CLINICAL REASONING AND DIFFERENTIAL DIAGNOSIS IN A DYNAMIC PRONATED FOOT DYSFUNCTION – THE CASE OF AN AMATEUR ATHLETE

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Physiotherapists as autonomous professionals have the need for an adequate differential diagnosis and screening for referral. It is an essential part of clinical decision-making¹. Clinical decisions should be based on the best data available. The clinical basis for diagnosis, prognosis and intervention must come from a set of valid and reliable evidence referred to as evidence-based practice. Each Physiotherapist should develop the skills needed to assimilate, evaluate, and best use evidence when assessing clinical conditions in patients / clients¹.

Excessive pronation of the subtalar joint, present during gait, running and other activities performed in closed kinetic chain, is an altered pattern of movement that has been both theoretically and clinically related to several pathological processes of the musculoskeletal system and target of Therapeutic Intervention.

The limitation of joint motion of the first metatarsophalangeal due to joint degeneration or structural change is known as Functional Hallux Limitus (FHL), or, if the joint is completely fixed, hallux rigidus³. In the presence of FHL, the mechanical support and stability mechanisms of the foot are interrupted with consequences in the knee and lower limb, which is deprived of its protection mechanisms and adopts a posture of increased flexion and valgus deformity⁴.

Keywords: Differential diagnosis, Clinical Reasoning, Physiotherapy, COPD, Respiratory assessment

CASE REPORT – CLINICAL REASONING AND DIFFERENTIAL DIAGNOSIS OF DISABILITY IN LOW BACK PAIN: INTERVENTION PROGRAM

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Low back pain is a frequent cause of morbidity and disability, being the main cause of activity limitation. In this sense, the individual's functionality reflects an interaction between health condition and the context: environmental and personal factors. Realizing this interaction is the most assertive way to prescribe the appropriate intervention program.

The aim of the study was to diagnose the disability associated with low back pain in a female patient, based on the elaboration of a differential diagnosis. For that, the parameters were evaluated: age, sex and schooling; Work situation; Location, duration and intensity of pain; Physiological changes; Degree of disability (Oswestry Disability Questionnaire) and general health status (SF-36v2 Health Status Questionnaire).

The results obtained in the evaluation, standardized according to the International Classification of Functioning, Disability and Health, enabled the performance of the functional diagnosis of the patient: low back pain with pain radiated to the right lower limb associated with inability to remain in the seated position.

The use of the movement/function system provided important information that goes beyond the diagnosis of the health condition itself – information about the impact that the diagnosis has on the life of the patient.

Thus, the present case study allowed to develop a clinical reasoning process to make a differential diagnosis and prescribe the intervention program – teaching and education, manual therapy and therapeutic exercise – more appropriate to the case, with a view to improving the functionality and perception of the quality of life.

Keywords: Differential diagnosis, Clinical Reasoning, Physiotherapy, Trail Running; Ankle; Chronic Instability

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