



Infrasound exposure promotes development of atrial fibrosis in rats

Ana Lousinha, Maria João R. Oliveira, Gonçalo Borrecho, José Brito, Pedro Oliveira, Gonçalo Pereira, António Oliveira de Carvalho, Diamantino Freitas, Artur P. Águas & Eduardo Antunes

To cite this article: Ana Lousinha, Maria João R. Oliveira, Gonçalo Borrecho, José Brito, Pedro Oliveira, Gonçalo Pereira, António Oliveira de Carvalho, Diamantino Freitas, Artur P. Águas & Eduardo Antunes (2021) Infrasound exposure promotes development of atrial fibrosis in rats, *Annals of Medicine*, 53:sup1, S90-S90, DOI: [10.1080/07853890.2021.1897455](https://doi.org/10.1080/07853890.2021.1897455)

To link to this article: <https://doi.org/10.1080/07853890.2021.1897455>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 28 Sep 2021.



Submit your article to this journal [↗](#)



Article views: 29



View related articles [↗](#)



View Crossmark data [↗](#)

Infrasound exposure promotes development of atrial fibrosis in rats

Ana Lousinha^a, Maria João R. Oliveira^b, Gonçalo Borrecho^a, José Brito^a, Pedro Oliveira^a, Gonçalo Pereira^a, António Oliveira de Carvalho^c, Diamantino Freitas^c, Artur P. Águas^b and Eduardo Antunes^a

^aCentro de Investigação Interdisciplinar Egas Moniz (CiiEM), Egas Moniz Cooperativa de Ensino Superior, Caparica, Portugal;

^bDepartment of Anatomy and UMB of Abel Salazar Biomedical Sciences Institute, University of Porto, Porto, Portugal; ^cEngineering Faculty, Polo da Asprela, University of Porto, Porto, Portugal

ABSTRACT

Introduction: Recent data has shown a significant association between noise exposure and atrial fibrillation (AF) in a large cohort [1] but the pathophysiology remains unclear. The acoustic spectrum of industrial environments is particularly rich in high-intensity infrasound (IFS), which we have previously found to induce coronary perivascular fibrosis in rat hearts [2–4]. The role of atrial fibrosis in AF is well documented and remains the cornerstone of atrial pathology in patients with this arrhythmia [5]. The aim of this study was to evaluate and measure the atrial interstitial fibrosis in rats exposed to high-intensity IFS.

Material and methods: Twelve Wistar rats exposed to high-intensity IFS (110 dB, <20Hz) during a period of 6 weeks and 12 age-matched controls were studied. All the handling and care of the experimental animals was performed by authorised researchers and was done in accordance with the EU Commission on Animal Protection for Experimental and Scientific Purposes (2010/63/EU). Hearts were transversely sectioned and the atrial fragment was selected for analysis. Chromotrope-aniline blue staining was used for histological observation and the images were obtained with an optical microscope using 400× magnifications. For each atrium, three optical fields containing more prominent fibrotic development in the absence of any arterial vessel were selected. The measurement of fibrosis was performed using *Image J software*. Mann–Whitney test was used to compare the groups.

Results: The mean values of atrial interstitial fibrosis were 8.96 ± 4.08 and 4.91 ± 1.46 , respectively, in IFS-exposed rats and controls. IFS-exposed rats exhibited a significant increase in atrial interstitial fibrosis ($p = .005$).

Discussion and conclusion: High-intensity IFS induces atrial interstitial fibrosis in rats. This finding reinforces the need for further experimental and clinical studies concerning the effects of IFS on the heart.

CONTACT Ana Lousinha  alousinha@gmail.com

References

- [1] Hahad O, Beutel M, Gori T, et al. Annoyance to different noise sources is associated with atrial fibrillation in the Gutenberg Health Study. *Int J Cardiol.* 2018;264:79–84.
- [2] Lousinha A, Antunes E, Borrecho G, et al. Histomorphometric evaluation of the small coronary arteries in rats exposed to industrial noise. *Int J Mol Sci.* 2015;16:1095–1104.
- [3] Lousinha A, Oliveira MJR, Borrecho G, et al. Infrasound induces coronary perivascular fibrosis in rats. *Cardiovasc Pathol.* 2018;37:39–44.
- [4] Antunes E, Oliveira P, Oliveira MJ, et al. Histomorphometric evaluation of the coronary artery vessels in rats submitted to industrial noise. *Acta Cardiol.* 2013;68(3):241–245.
- [5] Dzeshka MS, Lip GY, Snezhitskiy V, et al. Cardiac fibrosis in patients with atrial fibrillation: mechanisms and clinical implications. *J Am Coll Cardiol.* 2015;66(8):943–959.

DOI: 10.1080/07853890.2021.1897455

The reticular hypodermic venous system, the true integrator of the superficial venous system

J. Ovelar, J. Cédola and J. Merino

CIMED FUNDAMI Digital Anatomy Laboratory, La Plata, Buenos Aires, Argentina

ABSTRACT

Introduction: An anatomical observational, retrospective and cross-sectional study of the Venotomographies performed at CIMED was carried out from January 2014 to the present, with 105 studies of patients of both sexes. The study methodology was multislice computed venotomography, which allowed to achieve a live anatomical study in several