Investigation underway: Inherited arrhythmia leading to sudden deaths in young Finnish Leonbergers

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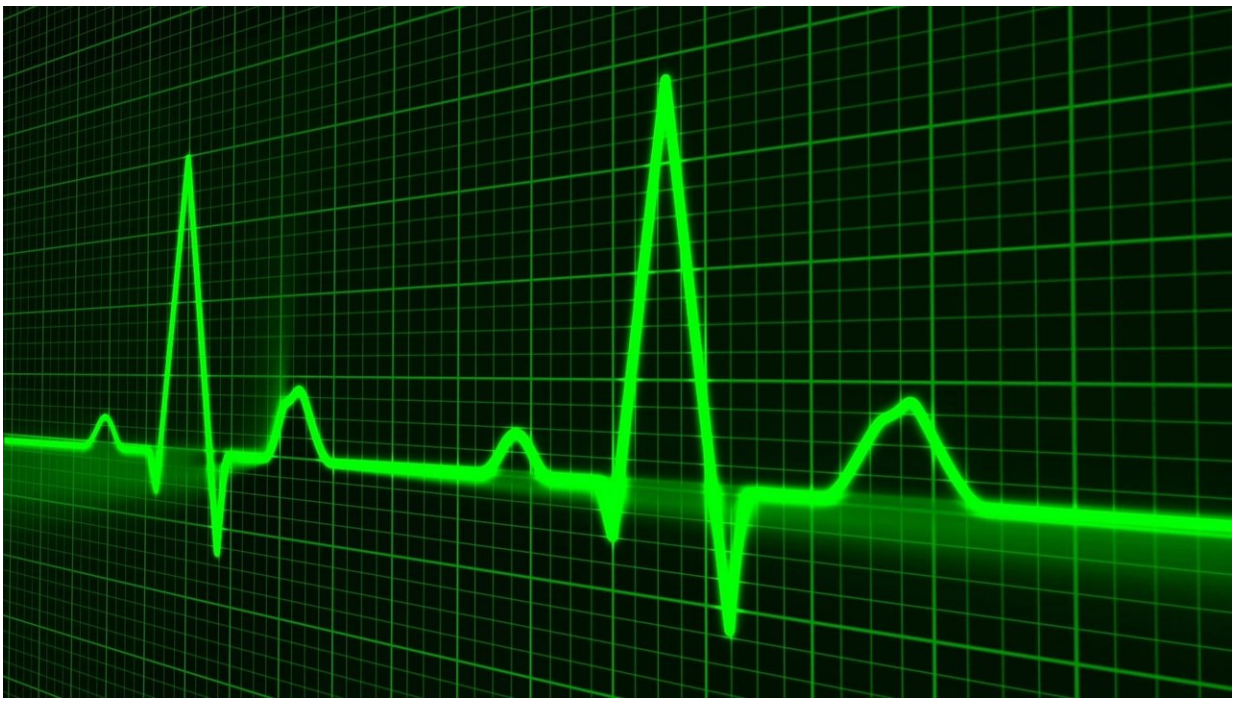

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A new study in Finland has revealed that inherited malignant ventricular arrhythmia is fairly common among Finnish Leonbergers under three years of age. At its worst, such arrhythmia can result in the dog's sudden death.

Arrhythmia and sudden death in Leonbergers have been a subject of research coordinated by Professor Hannes Lohi since 2016 at the Faculty of Veterinary Medicine, University of Helsinki, the University's Veterinary Teaching Hospital and the Finnish Food Authority.

A total of 46 Leonbergers were enrolled for comprehensive cardiac examinations, of whom 15 percent were diagnosed with severe arrhythmia and another 15 percent with milder cardiac changes. In addition, the project involved 21 Leonbergers that had died suddenly before turning three, and who had had a postmortem evaluation performed on them.

"No changes indicative of any other causes of death were identified in the evaluations, which makes cardiac arrhythmia the most likely cause of the sudden deaths," says Maria Wiberg, docent of small animal internal medicine at the Veterinary Teaching Hospital, who coordinated the clinical examinations.

Arrhythmia in dogs comes in varying degrees of severity. Diagnosing ventricular arrhythmia does not necessarily mean that the dog will perish, although the risk of sudden death does increase. For example, in a study previously carried out in the United States on German Shepherd dogs, it was found that arrhythmia becomes less frequent as the dog grows older. The severity of the disorder also varies from day to day.

In the Finnish study, the model of inheritance for arrhythmias was assessed on the basis of family connections between the dogs that had died suddenly and those suffering from arrhythmia.

Arrhythmia is common in Leonbergers, and the disorder is typically litter-specific, making it probable that the factors underlying it are hereditary. As it has not been possible to perform cardiac examinations on the afflicted dogs' parents when they were under the age of three, the

precise model of inheritance is yet to be determined. For dogs whose heart has been examined after turning three, the findings do not necessarily reveal arrhythmias suffered when young.

"We are in the process of carrying out a range of DNA analyses to identify the arrhythmia gene, a finding that would facilitate disease diagnostics. Furthermore, it would help compare findings to arrhythmia in humans, potentially increasing understanding of the biological causes of arrhythmias. This would boost early diagnostics, breeding programs and, potentially, the development of drug therapies. Ventricular tachycardia is also a significant and, to a considerable degree, unsolved problem in human medicine," says Professor Hannes Lohi.

The canine biobank of the University of Helsinki holds DNA samples from roughly 600 Leonbergers.

More information: M. Wiberg et al. Ventricular arrhythmia and sudden cardiac death in young Leonbergers, *Journal of Veterinary Cardiology* (2019). DOI: 10.1016/j.jvc.2019.11.006

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