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Scientists on the Spot: Putting a halt to hypertrophic cardiomyopathy

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Keywords

Hypertrophic cardiomyopathy • Sarcomere • Mutation

Watch the interview here: youtu.be/-9mHqppBM90



Highlight:

In this Onlife interview, Professor Christine Seidman talks about her research into the genetics of hypertrophic cardiomyopathy, and the potential of human induced pluripotent stem cells for the future of cardiovascular research.

Summary of interview

Professor Seidman spoke about the discovery of the first gene involved in hypertrophic cardiomyopathy as being a turning point of her career. It showed how genetics is a valuable approach to further understanding the molecular basis of heart muscle diseases. The basic idea that a mutated gene can be responsible for a cardiac disease opened a window onto other discoveries on of genetic mutations and molecular mechanisms leading to cardiac diseases.

According to Prof. Seidman, the consequences of hypertrophic cardiomyopathy from a genetic perspective is related to mutated genes which increase contractility and reduce relaxation of the contractile units of the cardiac muscle, namely sarcomeres. A few small, designed molecules are tested to reduce contractility, fully relax the sarcomeres and normalize the biophysical abnormalities. This is a means by which it may be possible

Biography:

Christine E. Seidman is Professor of Genetics and Medicine at Harvard Medical School and Director of the Cardiovascular Genetics Service at Brigham and Women's Hospital in Boston. She is known worldwide for her excellent expertise in cardiac genetics. She graduated in Medicine at the George Washington School of Medicine in 1978. After an internal medicine residency at John Hopkins Hospital, she received Cardiology training at the Massachusetts General Hospital. In 1997, she became Full Professor at Harvard Medical School and was named the Thomas W. Smith Professor of Medicine. Prof. Seidman has authored more than 400 peer-reviewed scientific articles among the best scientific and medical journals. She was elected at the National Academy of Medicine and National Academy of Arts and Sciences in 1999. She received the Distinguished Scientist Award from the American Heart Association in 2003 and the Grand Prix Lefoulon-Delalande Institut de France in 2007—jointly with Prof. Jonathan Seidman. She was elected to the National Academy of Sciences in 2005. In 2019, she received the Gold Medal from the European Society of Cardiology.

to reduce the development of hypertrophic cardiomyopathy, myocyte death, cardiac fibrosis, and attenuate adverse outcomes for the patient.

Next, Prof. Seidman discussed the enormous potential of using human induced pluripotent stem cell (hiPSC)s to derive cardiomyocytes from patients with inherited cardiac disorders. This tool has revolutionized cardiac biology and research. Simple blood samples from patients or healthy controls allow the generation of actual, beating hiPSC-derived cardiomyocytes. These cells also offer the great advantage of being genetically manipulated to induce or correct a mutation and allow comparison of between other cardiomyocytes with the same genetic background but with a precise mutation added. The hiPSC-derived cardiomyocytes can also help to form myocardial tissue to study the whole biology in microtissues and to aid with drug screening. Research in the area thus continues to strike a beat and the future for conditions such as hypertrophic cardiomyopathy looks promising.



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Conflict of interest: C.E.S. is a founder and owns shares in Myokardia, a start up company that is developing therapeutics that target the sarcomere.

Dr Albano Meli from the French National Institute of Health and Medical Research (INSERM) in Montpellier (France), interviews Professor Christine Seidman, Professor of Genetics and Medicine at Harvard Medical School and Director of the Cardiovascular Genetics Service at Brigham and Women's Hospital (USA).