

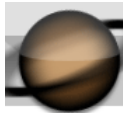


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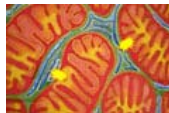


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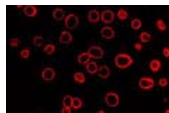
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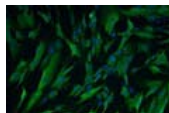
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In an improvement over open-heart surgery, cardiologists now use catheters to eliminate damaged heart tissue in certain patients, such as those with arrhythmias. But this, too, can be a long and painful procedure as many catheters, with different functions, need to be inserted sequentially.

Now an interdisciplinary team including researchers from Northwestern University has developed one catheter that can do it all. This tool for cardiac ablation therapy has all necessary medical devices printed on a standard balloon catheter: a device for eliminating damaged tissue using heat, temperature and pressure sensors, an LED and an electrocardiogram (EKG) sensor.

The multifunctional catheter makes a minimally invasive technique for heart surgery even better. Both diagnostic and treatment capabilities are combined in one. The stretchable electronics developed by Yonggang Huang of Northwestern and John Rogers of the University of Illinois at Urbana-Champaign make it possible.

The research was published 6 March by the journal Nature Materials.

'The use of one catheter to achieve all these functions will significantly improve clinical arrhythmia therapy by reducing the number of steps in the procedure, thereby saving time and reducing costs,' said Huang, Joseph Cummings Professor of Civil and Environmental Engineering and Mechanical Engineering at Northwestern's McCormick School of Engineering and Applied Science. He led the Northwestern portion of the work.

In conversation with collaborating cardiologists, Moussa Mansour, M.D., of Harvard Medical School; Marvin Stepan, M.D., of the University of Arizona; and Joshua Moss, M.D., and Brian Litt, M.D., of the University of Pennsylvania, Huang and Rogers recognised that their stretchable electronics could improve the surgical tools currently used in cardiac ablation therapy. This procedure is used to cure or control a variety of arrhythmias, or irregular heartbeats.

The electronics Huang and Rogers use in this study are based on a 'pop-out' design of interconnects, similar to their early design for stretchable electronics but with much larger - approximately 130 percent - stretchability. The type of arrhythmia the team focuses on is tachycardia, when the heart beats too fast; the tissue that induces this condition is the target of their ablation therapy.

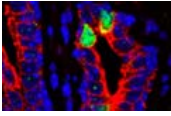
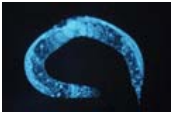
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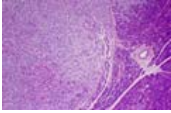
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