



PIEZOELECTRIC STENTS WITH SELF-POWERED ANTI-RESTENOSIS PROPERTIES

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The Invention

UW-Madison researchers have developed a new stent design that uses piezoelectric biomaterials to generate a localized, low-intensity electric field driven by blood pressure fluctuations. The self-generated piezoelectricity can disturb the surface electrical double layer, and thus prevent the accumulation of smooth muscle cells, an essential step in the development of stenosis. The stents are fabricated by direct 3D printing on a rotating metal surface with designed geometry. The piezoelectric composite was made of potassium sodium niobite (KNN) microparticles and PVDF (poly(vinylidene fluoride-cohexafluoropropylene)), materials that complement each other with appreciable piezoelectric performance and excellent mechanical stability. In-situ poling during 3D printing yielded a piezoelectricity coefficient of 4.2 pC N⁻¹ from the as received stents. Under simulated pressure variations, the piezoelectric stents are able to provide voltage with an average peak-to-peak value of 0.08 V. This level of electric field is expected to show noticeable interactions with the surface electrical double layer and negatively influence the cell attachment behavior. The piezoelectric stents may also be realized by coating a normal metal stent with a thin layer of piezoelectric material.

Additional Information

For More Information About the Inventors

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Tech Fields

- [Medical Devices : Other medical devices](#)

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867