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ARCI makes next-gen biodegradable metal implants

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Suitable for biodegradable stent and orthopedic implant applications



Scientists at the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) and Sree Chitra Tirunal Institute of Medical Sciences, Thiruvananthapuram both autonomous institutes under the Department of Science & Technology (DST) have jointly developed new generation Iron-Manganese based alloys for biodegradable metal implants for use in humans.

Biodegradable materials (Fe, Mg, Zn, and polymer), which can participate in the healing process and then degrade gradually by maintaining the mechanical integrity without leaving any implant residues in the human body are better alternatives to currently used metallic implants which remain permanently in the human body and can cause long-term side effects like systemic toxicity, chronic inflammation, and thrombosis.

The ARCI team employed both conventional melting and powder metallurgy techniques in manufacturing of the new Fe-Mn based biodegradable alloys and stent having dimensions as Diameter: 2 mm, Length: 12 mm and Wall thickness: 175 µm.

Iron-Manganese based alloy Fe-Mn (having Mn composition of more than 29% by weight) is a promising biodegradable metallic implant which exhibits single austenitic phase (non-magnetic form of iron) with MRI compatibility.

Based on the impressive results, the ARCI team is certain that the newly developed Fe-Mn based alloys are suitable for biodegradable stent and orthopedic implant applications. *Invivo* and *in-vitro* studies are being planned at Sri Chitra Tirunal Institute of Medical Sciences by the team.