Korea mimics atherosclerotic coronary artery using 3D-printing

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Successfully developed a customized 3D-printed occlude, applicable in inducing myocardial infarction in swine models

A research team at Pohang University of Science and Technology (POSTECH) in South Korea has succeeded in mimicking the atherosclerotic coronary artery using a 3D-printing system to reduce the number of unnecessary animal models.

The myocardial infarction model – a representative disease among animal models to verify the efficacy of heart disease treatments – is widely used to evaluate the effect of stem cells or tissue engineering technology on ischemic heart diseases.

Several methods are used to induce myocardial infarction in the swine model but the efficiency is mostly determined by the skill of the experimenter, which leads to a large discrepancy between experimental subjects. In addition, the conventional approaches block 100% of the coronary arteries, causing a high mortality rate in the swine model, which results in a steep increase to the experimental cost.

To minimize human intervention and increase accuracy, the researchers introduced a 3D-printing system. Angiography was performed on a swine model to measure the diameter of the coronary artery and based on this, they developed a customized occluder that mimics an atherosclerotic coronary artery with an approximately 20% blocked condition.

The 3D-printed occluder shows promise to enable researchers to use animal models in a more accurate and convenient manner.