

Singapore to develop Asia's first bioengineered human heart-in-a-jar

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Enabling researchers to bridge the gap between animal models and clinical trials



National Heart Centre Singapore (NHCS) has partnered with US-based Medera's Novoheart to create the world's first Asian patient-specific miniature human heart model with heart failure, known as "Human Heart-in-a-Jar".

The novel creation will be made possible through Asian patients' cell samples obtained from NHCS Biobank, a rich biorepository of anonymised biospecimens and clinical data of patients with cardiovascular disease, and Novoheart's proprietary technologies in the bioengineering of "Human Heart-in-a-Jar". The collaboration will focus on creating the first Asian patient-specific mini-heart models capable of reproducing key features seen in patients that have heart failure with preserved ejection fraction (HFpEF).

This partnership between NHCS and Medera's Novoheart will accelerate the care for HFpEF patients. The bioengineering of the Asian patient-specific HFpEF mini-heart model, "Human Heart-in-a-Jar", will be the first of its kind in Asia. Once successfully created, the "Human Heart-in-a-Jar" can reproduce key features seen in Asian HFpEF patients, including relaxation defects, fibrosis, and hypertrophy, and pave the way for precision medicine in HF.

With the world's first mini-Heart technology platform, Novoheart has previously partnered with AstraZeneca to construct the first HFpEF mini-Heart by molecular induction. The results have led to an ongoing FDA-approved First-In-Human Gene Therapy clinical trial in the United States.

To accelerate progresses, Novoheart will also contribute proprietary commercial-grade hardware and software for automation to increase the throughput, accuracy and sensitivity of phenotypic and drug screening experiments using the engineered human heart-in-a-jar assays.

NHCS received a \$5 million Industry Alignment Fund – Industry Collaboration Project (IAF-ICP) award from the Agency for Science, Technology and Research (A*STAR) to aid and accelerate drug discovery efforts for heart failure in Asian patients.