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New research in Singapore could aid regenerative heart therapies

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Researchers identify RBFox1 as a key intrinsic regulator of heart muscle cell maturation



Scientists led by Duke-NUS Medical School in Singapore and the University of California, Los Angeles, (UCLA) in the United States have discovered a new control mechanism that can drive the maturation of human stem cell-derived heart muscle cells, providing fresh insight into the maturation process of heart muscle cells from foetal to adult form.

After birth, heart muscle cells undergo extensive changes to become fully mature adult cells, altering their form, function and physiology. However, the regulatory processes governing this maturation have been poorly understood thus far.

For regenerative therapies in particular, this lack of understanding has proven a major limitation as efforts to grow stem cell-derived heart muscle cells have not been successful at producing mature adult cells, capable of restoring or improving heart function.

The research team used transcriptomic analysis to pinpoint an RNA splicing regulator named RBFox1 that was highly elevated soon after birth in a newborn heart. Analyses of published single-cell data also showed dramatic RBFox1 increase in maturing heart cells.

Moving forward, the researchers will investigate how RBFox1 coordinates splicing to direct the functional and morphological changes underlying maturation. Their long-term aim is to identify druggable targets that can boost heart cell maturation efficiency for regenerative medicine use.