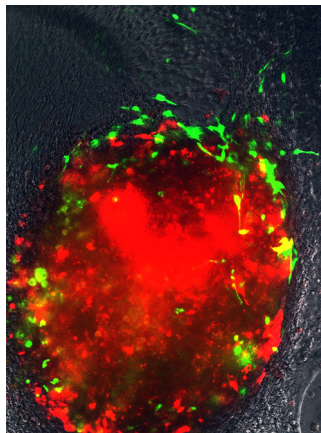


Simplified Isolation of Adult Mouse Cardiac Myocytes (p 909)

Ackers-Johnson et al describe a convenient technique for isolating cardiomyocytes.

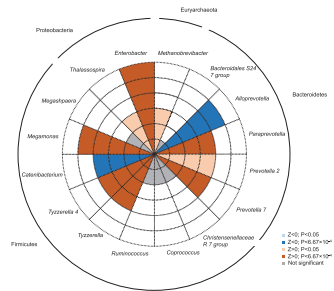
For the last four decades, the method of choice for isolating adult mouse cardiomyocytes has been to excise the heart, mount it on perfusion apparatus (known as a Langendorff system), and pump dissociation buffers into the chambers under pressure—ensuring their penetration deep into the myocardium to dissociate the tissue into single cells. While this technique reproducibly yields myocytes, perfusion of the isolated heart requires significant expertise and specialized equipment, which are a barrier to many researchers. Ackers-Johnson and colleagues now report that they could attain a hydrodynamic pressure similar to that of the Langendorff apparatus by simply clamping the aorta and injecting buffer directly into the heart wall. In this method, they first flushed the heart with anticoagulant, then clamped the aorta, excised the heart, and bathed it in dissociation buffer while also injecting the buffer into the left ventricle. Once tissue disruption was apparent, gentle agitation separated the cells. The team found that the yield and quality of the isolated cardiomyocytes was similar to that obtained with the Langendorff system, with cells retaining their characteristic morphology, transcription profile, and function. This faster and simpler approach, which requires only standard surgical and laboratory equipment, should enable more researchers to readily obtain large quantities of viable primary cardiac myocytes for single-cell studies.



Mesenchymal Stem Cells Stimulate Cardiac Stem Cells (p 921)

Hatzistergos et al investigate the stimulatory effects of mesenchymal stem cells on cardiac stem cells.

Cardiac stem cells (CSCs), which express the cell surface marker c-kit, have been investigated for their capacity to replenish cardiomyocytes in damaged heart tissue. However, recent reports have suggested that the contribution of CSCs to endogenous cardiomyogenesis is relatively low. Other reports suggest that the cardiomyogenic potential of transplanted CSCs may be boosted in the heart by other cell types. For example, in a porcine model of chronic ischemic cardiomyopathy, mesenchymal stem cells (MSCs) have been reported to work synergistically with CSCs to improve cardiac function. The mechanism by which MSCs enhance CSCs is unclear, however. MSCs are known to secrete both stem cell factor (SCF), which interacts with c-kit, and stromal cell-derived factor (SDF), which interacts with cell surface protein CXCR4. Hatzistergos and colleagues now show that MSCs stimulate CSC proliferation via SCF-c-kit signaling, and affect CSC migration and differentiation via SDF-CXCR4 signaling. Although the team found that endogenous CSCs possess minimal cardiomyogenic potential, their results indicate that modulating SCF-c-kit and SDF1-CXCR4 signaling could maximize this potential. These findings strengthen the rationale for further investigations of cell-combination therapies for myocardial regeneration.



Gut Microbiome and Cardiovascular Disease Risk (p 956)

Composition of the gut microbiome reflects lifetime risk of cardiovascular disease, report Kelly et al.

It is being increasingly appreciated that the collection and diversity of a person's gut microbes (the microbiota) can influence their health. For example, particular microbiota compositions have been associated with obesity, diabetes, and other risk factors for cardiovascular disease (CVD). However, it is unclear whether gut microbiota composition is associated with a person's overall CVD risk. To address this gap, Kelly and colleagues examined 112 participants (55 determined to be at high risk of CVD, and 57 at low risk) from the Bogalusa Heart Study (BHS)—a long-term epidemiological study of the lifetime development of atherosclerosis. The team took stool samples from the participants, isolated microbial DNA, and performed deep sequencing to determine which microbial species were present. They found that increased microbial diversity was consistently associated with lower CVD risk. They also identified specific genera of bacteria that were significantly associated with either high or low CVD risk. Although cause-and-effect relationships between microbiota composition and CVD could not be established, such a link, if validated, would suggest that microbiome-altering treatments could lessen CVD risk.

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