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Abstract: While acute myocardial infarction mortality declines, patients continue to face reinfarction and/or heart failure. The immune system, which intimately interacts with healthy and diseased tissues through resident and recruited leukocytes, is a central interface for a global host response to ischemia. Pathways that enhance the systemic leukocyte supply may be potential therapeutic targets. Pre-clinically, imaging helps to identify immunity's decision nodes, which may serve as such targets. In translating the rapidly-expanding pre-clinical data on immune activity, the difficulty of obtaining multiple clinical tissue samples from involved organs is an obstacle that whole-body imaging can help overcome. In patients, molecular and cellular imaging can be integrated with blood-based diagnostics to assess the translatability of discoveries, including the activation of hematopoietic tissues after myocardial infarction, and serve as an endpoint in clinical trials. In this review, we discuss these concepts while focusing on imaging immune activity in organs involved in ischemic heart disease.

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