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Sterile inflammation and inflammasome in cardiovascular medicine: current status and prospects of therapy

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Increasing evidence indicates that NLRP3 inflammasome plays a crucial role in the pathophysiology of cardiovascular diseases associated with sterile inflammation, including atherosclerosis and acute myocardial infarction (MI). NLRP3 inflammasome is a multimeric protein complex that leads to activation of caspase-1, which further induces maturation of interleukin (IL)-1β and IL-18. Activated caspase-1 also induces a particular form of cell death called pyroptosis via the cleavage of gasdermin D. We have shown that inhibition of the NLRP3 inflammasome attenuates the inflammatory response and ameliorates the severity of disease in murine models of cardiovascular diseases, such as atherosclerosis, MI, and aortic aneurysm. Moreover, the recent CANTOS trial showed that inhibition of IL-1β was efficacious in secondary prevention for cardiovascular events in patients with previous MI. These findings suggest that NLRP3 inflammasome may be a potential target for the prevention and therapy of cardiovascular disease. In this session, I summarize the current status of knowledge regarding the role of NLRP3 inflammasome in cardiovascular disease and discuss the prospects of NLRP3 inflammasome-targeted therapy.