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Inflammasomes in inflammatory disease

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Background: Inflammasomes are multi-protein platforms that are organized in the cytosol to cope with pathogens and cellular stress. The pattern-recognition receptors NLRP1, NLRP3, NLRC4, AIM2 and Pyrin all assemble canonical platforms for caspase-1 activation. Inflammasomes contribute to host defense through their roles in maturation and secretion of the inflammatory cytokines interleukin-(IL)1β and IL18, and they also induce pyroptosis. Their activation mechanisms and involvement in sterile inflammatory disease is less clear.

Materials and methods: We use a combination of inflammasome knockout mice and purified peripheral blood mononuclear cells (PBMCs) from healthy donors and autoinflammatory disease patients to characterize the mechanisms of inflammasome activation.

Results and conclusions: Unlike their beneficial roles in controlling pathogen replication, deregulated inflammasome activation is detrimental in the context of chronic autoinflammatory diseases. I will illustrate this with ongoing work characterizing inflammasome activation in Familial Mediterranean Fever.