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The inflammasome

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There is a clear need for interdisciplinary research and publications that bring together scientists who work on the inflammasome. This protein complex, termed the inflammasome and many of its components are implicated in disease disorders, autoimmune, and infectious diseases. The structure, activation, and regulation of the inflammasome complex have been and are still studied in increasing number of laboratories around the world. Our goal is to provide an issue summarizing every fascinating aspect of inflammasome activation and modulation of the innate immune response to microbial and to danger signals. This issue will bring the experts in inflammasome research up to speed with the most recent findings. However, several reviews are geared toward introducing the new scientists to the inflammasome complex and to the fundamental and essential information that will help them understand and even pursue their studies in this direction. By looking at the two sides of the coin, notably, some authors focused on the inflammasome as a major participant in innate immunity and tackled the infectious agents as modulators. Other authors considered the organism as the major player in the infected cell, while considering the inflammasome a contributor to immune response and to the fate of the pathogen.

The basics of the inflammasome and its essential functions in the cell are reviewed in details by Dr. Lamkanfi. As an expert in caspases and their activation, Dr. Lamkanfi presented the fundamental information regarding the composition and the activation of the inflammasome. He then supplied a nice overview on how bacterial and viral pathogens prevent the activation of the inflammasome, in most cases to their advantage. Dr. Saleh's review explored deeper aspects of the inflammasome during bacterial, viral, fungal, parasitic, and fungal infections. She provided a detailed description of how pathogens interact with the inflammasome, avoid, or suppress it. Then, Dr. Kanneganti polishes our knowledge about the inflammasome with her expert opinion on the major molecules involved in the modulation of the inflammasome and on human diseases impacted by the inflammasome.

Indeed, several biological pathways alter the inflammatory response to infectious agents. One of the recently recognized pathways is autophagy. Dr. Munz elegantly described how autophagy modulates inflammation and infection. He also provided information on how the inflammasome controls autophagy. On the other hand, microbe-focused reviews convince us that the pathogen ironically manipulates, exploits and evade recognition, and innate immune response by extraordinary tactics. Some organisms survive inside or outside enclosing vacuoles within eukaryotic cells such as *Listeria* reviewed by Dr. Opitz. He focused his review on the ability of this organism to differentially coordinate immune responses whether inside or outside an enclosing vacuole. Bacteria with increasing tendency to linger within enclosed vacuoles such as *Salmonella*, possess a plethora of virulence factors employed to modulate the innate immune response and inflammation is reviewed by Dr. Franchi. Surprisingly, vacuole-residing organisms such as *Mycobacteria* still modulate the inflammatory responses beyond its well protected vacuole. Dr. Torrelles describes in details how *Mycobacteria* perform this task. Dr. Gavrilin draws our attention to the important differences in innate immune responses between human and mice in response to *Francisella*. The review by Dr. Amer on why humans are susceptible to *Legionella* while mice are resistant further emphasizes this notion. This issue is embellished with two original research articles describing new findings in *Legionella* pathogenesis by Zamboni and Amer groups. Hope when the reader reaches the end of this issue, he or she will be fascinated with the interplay between the inflammasome and the pathogen.

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