

## Unlocking the Secrets of Inflammation: Transforming NLRP3 Inflammasome to Personalized Therapy

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**Abstract :** NLRP3 inflammasome-mediated signal initiation, transduction, integration, and perception is activated in multiple cancers by pro-tumorigenic and anti-tumorigenic roles. The blockade of NLRP3 inflammasome and the induction of inflammatory response by SARS-COV-2 leads to the direct inhibition of cytokine products. NLRP3-mediated neuroinflammation contribute to the pathogenesis of neurodegenerative diseases. Therefore, inhibitors directly targeting the NLRP3 inflammasome in cancer, COVID, and neurodegenerative disease, are worth investigating further in clinical trials and drug discovery. Nuclear receptors (NR) are transcription factors that play vital roles in multiple biological processes, such as growth, development, metabolism, reproduction, and inflammation. Adeno-associated virus (AAV) is an appealing and leading gene therapy viral vector candidate for treating a variety of diseases, such as cancer, retinal diseases, blood diseases, and neurodegenerative diseases. MicroRNAs (miRNAs) play a pivotal role in the pathogenesis of chronic inflammatory diseases, such as Alzheimer's disease, atherosclerosis, and multiple sclerosis. Consequently, combined therapy of NLRP3 with NR, AAV and miRNAs will lead to the development of novel preventions and therapeutics.

**Keywords :** NLRP3 inflammasome, cancer, COVID, neurodegenerative diseases, personalized therapy

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