Regulatory role of lncRNA NEAT1 in microglial NLRP3 inflammasome activation

063

Bora Tastan [1, 2], Burak Ibrahim Arioz [1, 2], Nilsu Askin [2], Aysen Cotuk [2, 3], Sermin Genc [1, 4]

[1] *Izmir International Biomedicine and Genome Institute, Dokuz Eylul University, Izmir, Turkey*
[2] *Izmir Biomedicine and Genome Center, Izmir, Turkey*
[3] *Department of Molecular Biology and Genetics, Izmir Institute of Technology, Izmir, Turkey*
[4] *Department of Neuroscience, Health Science Institute, Dokuz Eylul University, Izmir, Turkey*

Inflammasome activation, an evolutionarily conserved mechanism, is one of the innate immune system's responses. The NLRP3 inflammasome is most studied among several inflammasome complexes as it contributes to various autoimmune diseases, metabolic disorders, and neuropsychiatric diseases. Once activated, the NLRP3 inflammasome complex leads to Caspase-1 activity and eventually cleavage and secretion of pro-inflammatory cytokines, IL-1β and IL-18.
Regulation of inflammasome activation occurs at many levels. Long non-coding RNAs whose length is over 200 nucleotides regulate inflammasome activation during both priming and activation steps. Nuclear Enriched Abundant Transcript 1 (NEAT 1) and other proteins NONO, SFPQ form a protein complex called paraspeckle regulating gene expression by preventing translocation of mRNAs and miRNAs into the cytoplasm.
In this study, we showed the regulatory role of NEAT1 on microglial NLRP3 inflammasome activation by utilizing the LPS and ATP model in N9 microglia. We used different molecular biological tools, including Western Blotting, RIP, FISH, and NEAT1 siRNA. Determining the role and mechanism of NEAT1 in the regulation of microglial NLRP3 inflammasome activation will lead to the development of LncRNA-targeted innovative therapeutic strategies and will shed light on the mechanisms of many neurological and neuropsychiatric diseases in which NLRP3 inflammasome activation participates in the pathogenesis.