Dept. Clinical Chemistry and Laboratory Medicine

Professor Pavel Ivanov

Harvard Medical School and Immunologist at Brigham and Women's Hospital in Boston, USA

Talk

When RNA Adaptation Fails - or Goes Too Far: Neurodegeneration, Cancer, and Beyond

2. December 2026, 14:30 – 16:00 pm, N27, Room 2033

Cells rely on dynamic RNA-mediated mechanisms to survive environmental, metabolic, and physiological stress. These mechanisms integrate translational control, RNA cleavage and remodeling, RNA–protein interactions, and the assembly of stress-induced ribonucleoprotein condensates. In this lecture, I will explore how disruption of these adaptive processes contributes to human disease, emphasizing a fundamental contrast between insufficient stress adaptation in neurodegeneration and excessive or persistent adaptation in cancer. Using examples from stress granule biology, tRNA-derived RNAs, and RNA-mediated translational regulation, I will discuss how loss of protective RNA functions may increase neuronal vulnerability and compromise cellular resilience. Conversely, cancer cells can exploit the same adaptive machinery to tolerate unfavorable environments, resist cell death, and acquire phenotypic plasticity, including epithelial–mesenchymal transition (EMT). Related mechanisms may also contribute to persistent activation of fibrogenic programs and pathological tissue remodeling. Together, these observations support an emerging framework of Adaptive RNA Biology, in which RNA regulatory networks determine whether cellular stress results in recovery, pathological adaptation, or disease progression.

