THE UNIVERSITY OF BRITISH COLUMBIA
Life Sciences Institute

CIHR IRSC
Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

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Faculty of Medicine
Department of Cellular & Physiological Sciences

THE 20th D. HAROLD COPP LECTURE

Friday, April 5th, 2024 at 3:00 pm

Life Sciences Centre Rm 1001 (LSC1)

Social Hour in the LSI West Atrium to Follow

Ramanujan Hegde, Ph.D.

Head, Cell Biology Division
MRC Molecular Biology Laboratory
Cambridge, United Kingdom

Orphan Protein Quality Control in Health and Disease

A mammalian cell's proteome comprises around 10 billion individual proteins of 10,000 or more types. The health of a cell depends on these proteins being produced at precise ratios, folded correctly, localised among numerous compartments, and assembled into larger complexes that carry out nearly all of life's biochemistry. We want to understand how this incredible multi-layered organisation is generated and maintained. We find that failures in protein localisation or assembly are inevitable due to limitations on their overall efficiency. Such failed products are recognised by the cell and promptly degraded to avoid the accumulation of aberrant and potentially harmful proteins. We have taken a biochemical strategy to identify factors that recognise and dispose of mis-localised or unassembled proteins, which we term orphans. These factors play crucial roles in maintaining protein homeostasis in the cell, and when mutated, contribute to diseases of protein misfolding such as neurodegeneration. Conversely, they may be particularly crucial for facilitating rapid grow of mutation-ridden cancer cells in need of robust quality control systems.

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