Australian National University

Of nature and nurture: from RNA interactomes to REM networks

Director's School Seminar Series

Friday 10 August 2012 12pm

Matthias W. Hentze European Molecular Biology Laboratory, Heidelberg, Germany

Slatyer Seminar Room R N Robertson Building (#46), ANU

RNA-binding proteins (RBPs) orchestrate virtually all aspects of RNA biology. I plan to speak about rapidly progressing new work identifying "all" mRNA binding proteins (the "mRNA interactomes") of mammalian cells and yeast using a new system-wide approach that we refer to as "Interactome capture". Employing two complementary protocols for covalent UV-crosslinking of RBPs to RNA, we have identified 860 RBPs fom HeLa cells that are significantly enriched over negative controls shown by analysis of independent repeat experiments. Following validation, the in vivo HeLa mRNA interactome adds more than three hundred RBPs to those previously known. The described method is broadly applicable to study mRNA interactome composition and dynamics in varied biological settings. These data shed new light on diverse aspects of RNA biology, including RBPs in disease and novel RNA-binding architectures. We also identify enzymes of intermediary metabolism that moonlight as RBPs in vivo, implicating these in the recently proposed REM (RNA/enzyme/metabolite) networks for the coordination of cell metabolism and gene expression.

Matthias W. Hentze is the Associate Director of the European Molecular Biology Laboratory (EMBL) and Professor of Molecular Medicine at Heidelberg University. Following medical training in Germany and the U.K., Matthias did his postdoc at the NIH (USA) in the late eighties, when he discovered "iron-responsive elements" initiating his interests in posttranscriptional gene regulation (translation, mRNA stability, NMD, miRNAs) and diseases of iron metabolism (anemias, hemochromatosis, degenerative diseases). Matthias co-founded and co-directs the "Molecular Medicine Partnership Unit", a joint interdisciplinary and translational research unit of the Medical Faculty of Heidelberg University and the EMBL, which bridges between medicine and molecular biology. He has received numerous national and international research honors; he is an elected member of EMBO and the German Academy of Sciences, and a recipient of Germany's highest research award, the Gottfried Wilhelm Leibniz Prize (2000). With his recent ERC Advanced Grant, the Hentze group explores how metabolism and gene regulation are coordinated.

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STAFF LECTURE