

Dietary Regulation of Liver Regeneration

Dr. Manuel A. Fernandez-Rojo – IMDEA Food Institute

Abstract

Elevated mortality in liver transplantation-waiting list, clinical complications and scarcity of paediatric liver-donors warrant alternatives to liver transplant for treating paediatric-chronic liver diseases (CLD). Liver's unique intrinsic capacity to regenerate damaged tissue constitutes a potential approach. However, CLD hinders liver regeneration. We hypothesized that Ketogenic Diet (KD), that ameliorates CLD, could restore liver regeneration. Nonetheless, in this seminar I present unpublished data supporting that KD-feeding impairs liver regeneration and increases mortality after partial hepatectomy in juvenile CLD-and healthy-mice. However, KD did not reduce the incidence and growth of hepatocarcinomas suggesting that KD impairs cell proliferation in a regeneration-specific manner. KD impaired one-carbon metabolism, induced a liver progenitor-like transcriptional signature before hepatectomy, deregulated the molecular machinery for liver cells exiting quiescence and proliferate as well as altered innate immune response. Consistent with methionine-deficiency in KD underlying impaired liver regeneration, methionine supplementation restored hepatic regenerative capacity and survival in juvenile healthy and diet-induced CLD-mice.

Bio

Dr. Manuel A. Fernandez-Rojo holds a bachelor's in biology (1999) and a PhD in Cell Biology (2005) by the University of Barcelona (Spain). For his PhD studies on the cell biology of the protein Caveolin-1 in the lipid droplet dynamics during liver regeneration, Manuel was awarded the Margalef prize by the University of Barcelona as recognition for the best scientific manuscript derived from a PhD Thesis (Fernandez MA et al., Science. 2006) and the highly competitive Spanish Minister of Education and Science Postdoctoral Fellowship (~NHMRC-Postdoc Fellowship). Afterwards, he performed postdoctoral stays in Australia for over 12 years including in Rob Parton's Lab (UQ), Tony Tiganis' Lab (Monash) and Grant Ramm's group (QIMR Berghofer). In 2017, Manuel was awarded a TALENTO Grant (Program of Research Excellence, Madrid Government, ~NHMRC-CDF2/SRF award) and returned to Spain to set the Hepatic Regenerative Medicine Laboratory at the IMDEA-Food Institute (Precision Nutrition and Aging Program). He has also been awarded NHMRC and The Diabetes Australia Research Trust grant projects and he is an Honorary Associated Professor at UQ. Manuel has provided seminal contributions to the field of hepatology, cell biology and metabolism. Moreover, he is part of the experts that provides recommendations to the Space European Agency to implement multi-omics in life Science studies in space missions. He is co-author in 2 patent applications in liver diseases and a new animal venom-derived senolytic and recently the Ministry of Science, of Spain recognized the excellence of his research with the I3-certificate.

Manuel's projects aim to restore the regenerative capacity in chronic liver diseases to reduce the need of hepatic transplants and prevent liver cancer & metabolic/cardiovascular disorders associated to hepatic pathologies.



EVENT DETAILS

DATE:

Tuesday 13th February 2024

TIME:

10:00am

VENUE:

Via Zoom

HOST:

Professor Peter Currie



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