



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

HORIZON EUROPE  
PROJECTS FUNDED AT THE UNIVERSITY OF PADOVA

**PLURImet - Building a metabolic atlas of human pluripotency: dissecting the interplay between pluripotency and metabolism in human stem cells.**

The naïve inner cell mass of the human embryo is characterized by unlimited developmental plasticity as it gives rise to all somatic and extraembryonic lineages. Following implantation, extraembryonic and auto inductive signals prime pluripotent cells for differentiation toward the three germ layers. Concomitantly, metabolic gene expression transits from oxidative phosphorylation towards a glycolytic metabolism. This developmental progression can be recapitulated in vitro using human pluripotent stem cells (hPSCs), a prominent tool for basic and translational research with a great impact on health and economics. Ligands of the JAK/STAT pathway are routinely used for the expansion, generation, and differentiation of naïve hPSCs. In rodents, JAK/STAT signaling controls both pluripotency gene expression and metabolism, but its role in human pluripotency is still unclear. In this project, I will unravel the contribution JAK/STAT pathway to both the transcriptional program and metabolism of human naïve pluripotency. I will study the role of metabolism during the generation, expansion, and differentiation of naïve hPSCs. Moreover, I will produce the first comprehensive computational model of hPSC metabolism to identify metabolic changes associated with human pluripotency transitions. This study is highly interdisciplinary, including scientific expertise encompassing cellular and molecular biology, biophysics, high throughput technologies, and computational biology. The wide scientific and transferable skills training provided by the host institution will allow me to achieve personal and professional maturity, crucial for an independent and competitive scientific career in Europe. The variety of the dissemination and communication measures implemented will definitively ensure maximal reachability to the project, maximizing the scientific and social return of this research.

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