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INICIATIVA CIENTIFICA MILENIO

**Institute for Cell Dynamics and Biotechnology:
a Centre for Systems Biology**

UNIVERSIDAD DE CHILE

SEMINARIO

“OF MEGAKARYOCYTES AND PLATELETS”

Prof. Invitado E. Terry Papoutsakis

*Department of Chemical Engineering &
the Delaware Biotechnology Institute
University of Delaware - USA*

**MIÉRCOLES 25 DE MARZO –12:00 HRS.
(habrán refrescos y pizzas)**

**FACULTAD DE CIENCIAS
AUDITORIO EDIFICIO BIOLOGIA MILENIO
UNIVERSIDAD DE CHILE
LAS PALMERAS 3425 - SANTIAGO**



Of megakaryocytes and platelets

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Hematopoiesis is the process of blood-cell production by an animal or human. The molecular mechanisms underlying differentiation of hematopoietic stem cells into megakaryocytes (Mks) are poorly understood. During megakaryopoiesis, committed progenitor cells undergo endomitosis resulting in polyploid, multi-lobated nuclei. Later, a constitutive program of apoptosis is linked to proplatelet formation. Proplatelets eventually form platelets, the small anuclear cells responsible for blood coagulation, vascular repair, and immune response. The ability to generate proplatelets or platelets *ex vivo* (i.e., outside the body) from human stem cells for transfusion medicine would revolutionize platelet-dependent transfusion therapies. Can we design and construct a blood factory? What is the potential and limitations? In order to achieve such a demanding goal, several issues must be resolved, among which, for Mk production, is the ploidy (i.e., the multiples of nuclear material in a polyploid cell compared to a normal 2N cell) of the *ex vivo* maturing Mks, and this is the target of our research and the focus of this presentation. Using genomic tools, primary cells and mouse cells, I will discuss how we started to deconvolute novel aspects of megakaryopoiesis and its regulators (p53, NF κ B and SIRT5) and how small molecules can be used to enhance *ex vivo* megakaryopoiesis, and, hopefully, the *in vivo* one, as well. I will show how novel genomic analyses guided this discovery-driven project and show the large number of targets we have identified for current and future investigations.