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Seminario CIQUS/CIMUS: What does a cell cycle inhibitor when it does not inhibit the cell cycle? A secret life in cancer biology and beyond

Anxo Vidal

(CIMUS)

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Aula de Seminarios do CIQUS

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“ What does a cell cycle inhibitor when it does not inhibit the cell cycle? A secret life in cancer biology and beyond. ”

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The mammalian cell cycle is tightly controlled by a complex network of regulatory proteins. At least three families of so-called cell cycle inhibitors (Ink4, Cip/Kip and the pocket proteins) conspire to prevent inadequate cell cycle progression at the G1/S transition.

It has now became clear that beyond their role inhibiting proliferation, these proteins have additional functions. They can act as regulators of apoptosis, cell migration, and as transcriptional cofactors, among others.

A major goal of our group (Cell cycle and Oncology Laboratory, CIMUS) is to understand how deregulation of cell cycle leads to tumorigenesis and in recent years we have focused in the study of the cell cycle-independent roles of cell cycle inhibitors. This is because while there is overwhelming evidence that cell cycle inhibitors act as tumor suppressors, it is unclear which if any of these new roles contribute to their antitumoral activities. Similarly, the impact of these new functions has only been shown for a limited number of examples, and the full extent of their physiological relevance remains to be explored.

In this talk I will show examples on how our work has contributed to discover new functions of cell cycle regulators in tumor invasion or bone development and how our findings highlight the relevance of Cip/Kip proteins as transcriptional repressors in cancer and stem cell biology.

Anxo Vidal Biosketch

Anxo Vidal received his Ph.D. in Cell Biology in 1997 at the University of Santiago de Compostela (USC). From 1998 to 2003 he was a postdoc under the supervision of Dr Andrew Koff, in the Laboratory of Cell Cycle Regulation at Memorial Sloan-Kettering Cancer Center, New York. During this period, Anxo's interests focused in the study of p27Kip1 regulation (a cell cycle inhibitor and a tumor suppressor), and in the genetic and functional relationships among tumor suppressors. In 2002 Anxo was ranked no. 2 nationwide in the area of Physiology in the "Ramon y Cajal" Program. Back in Santiago de Compostela in 2003, he established his own laboratory devoted to study cell cycle control and cancer biology by using mouse models and functional genetics approaches. Since 2008, he is an Associate Professor of Physiology at USC.

Anxo was involved in the characterization of 'cis' elements on p27 mRNA important for its translation, the isolation of proteins that bind those sites and in the delineation of signaling pathways involved (Millard et al MCB 2000; Vidal et al JBC 2002). His work has contributed to discover new functions of cell cycle regulators in angiogenesis (Vidal et al, PNAS 2005), endochondral bone formation (Yeh et al, Mol Cell Biol 2007), as well as in embryonic (Li et al Cell Stem Cell 2012) and adult stem cell biology (Marques-Torrejon et al Cell Stem Cell 2013; Porlan et al Nature Neuroscience 2013).

He was the recipient of the 2006 Novartis Award in Endocrine Tumor Pathology. Invited speaker at several national and foreign research centers, he is an author of some 30 international publications in high impact journals (Nature Neuroscience, Cell Stem Cell, PNAS, EMBO J...). Principal investigator of competitive national and international grants, he has also participated in research consortia and in a European project about metastatic cancer treatment.