ISTITUTO ONCOLOGICO VENETO-IRCCS

PRESS RELEASE

"Aurora-PLK1 cascades as key signaling modules in the regulation of mitosis": De Nicolo – Joukov article is the cover story in Science Signaling

A review on the mechanisms of cell division on the cover of the prestigious scientific journal. A wide overview of the discoveries in the field of the regulation of mitosis.

PADOVA, 8 NOVEMBRE 2018 - A notable achievement for the Veneto Institute of Oncology IOV–IRCCS thanks to Dr. Arcangela De Nicolo, a passionate and dedicated physician-scientist, who has carried out cancer research in the United States for many years prior to joining the Institute. Dr. De Nicolo and her American colleague Dr. Vladimir Joukov have recently published a review article on the mechanisms of cell division that was featured as a cover story in *Science Signaling*–one of the six prestigious peer-reviewed journals by the American Association for the Advancement of Science (AAAS).

"Most cells in our body divide by mitosis–a highly complex process whereby a parent cell produces two genetically identical daughter cells" explains Dr. De Nicolo, adding that so-called 'basic research' is essential for the advancement of our understanding of cancer. "Mitosis is tightly controlled and any perturbation of this control may lead to unrestrained cell proliferation, which is a hallmark of cancer. Accurate elucidation of the physiological mechanisms underlying mitosis is, therefore, a prerequisite to understanding their pathological dysregulation and, ultimately, to devising possible therapeutic interventions".

Factors controlling protein phosphorylation and dephosphorylation play a key role in mitosis regulation. Comprehension of how a variety of mitotic processes are regulated by a small number of specific protein kinases (i.e. enzymes that catalyze phosphorylation through attachment of phosphate groups to target proteins) has long been elusive. Research over the last two decades, including Dr. De Nicolo's and Dr. Joukov's studies (published in *Proceedings of the National Academy of Sciences of the United States of America* in 2010

and *Molecular Cell* in 2014), has shed light on this conundrum through the identification of four scaffold proteins that organize the major mitotic kinases into distinct complexes and

signaling cascades, which operate at different cellular compartments and structures and control various mitotic events. In their review article in *Science Signaling*, Drs. De Nicolo and Joukov provide a comprehensive overview of the recent discoveries in the field and bring forward new concepts and hypotheses on the regulation of mitosis.

Arcangela De Nicolo has had an unwavering quest for cancer research since the Medical School. To expand her scientific horizon, she moved to the United States, where she completed her Ph.D. studies and postdoctoral training (as a Research Fellow in Genetics) at Harvard University, in Boston. In 2009, she accepted a joint Faculty academic appointment at Harvard Medical School, Dana-Faber Cancer Institute, and Brigham and Women's Hospital. In the United States, Dr. De Nicolo initiated several research directions, spanning from the elucidation of mechanisms underlying breast and ovarian cancer predisposition, to the analysis of pathway disruption in sporadic triple negative breast cancer, to the investigation of the fundamentals of cell division. Dr. De Nicolo has carried out research on the latter topic together with Dr. Joukov (formerly at Harvard Medical School and now at the N.N. Petrov National Medical Research Center of Oncology in Saint-Petersburg, Russian Federation). Their studies have already received recognition from the scientific community.

Since her relocation to Italy, Dr. De Nicolo, who continues the research initiated in the United States, has also been involved in studies on cutaneous melanoma, hereditary and sporadic, and coordinates a number of national and international collaborative networks of centers involved in translational research pertaining to cancer predisposition. Being an M.D., Ph.D., she has always maintained a strong connection to the clinic, staying abreast of the latest challenges in medical oncology, and she is a strong proponent of research that transcends traditional disciplinary boundaries.

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