CeNT CENTRE OF NEW TECHNOLOGIES

UNIVERSITY OF WARSAW

invites to a seminar by

Prof. Zbigniew Darzynkiewicz
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Birth and death of the cell explored by multiparameter flow and imaging cytometry

11th May 2017 at 12:00 p.m.

Venue: Centre of New Technologies, Banacha 2C,
Lecture Hall 0142 (ground floor)

Host: Prof. Joanna Kargul

The driving force for progress in biology and medicine is the development of new analytical instrumentation and the associated methodologies. The founding and expansion of flow and imaging cytometry, the methodologies that make it possible to analyze individual calls in a large cell populations, opened a plethora of possibilities to explore the molecular mechanisms fundamental to understanding of cell proliferation, growth and death. Having an opportunity to participate from the very beginning in developing instrumentation and these methodologies the author was able to make numerous contributions in this field. Presented will be the development of the assays to: (i) analyze DNA in situ denaturation, heat or acid induced, which made it possible to reveal differences in chromatin organization between normal and infertile sperm cells, currently used the assay of male fertility in veterinary and human clinic; (ii) detect differences in chromatin structure between quiescent (G_o) and cycling cells; (iii) differentially stain RNA versus DNA, to distinguish seven different compartments of the cell cycle, including identification of the quiescent, noncycling cells, and correlate the rate of cell cycle progression with RNA content; (iv) immunocytochemically detect expression of cyclin D, cyclin E, cyclin A and cyclin B1 concurrently with DNA content to further subdivide cell cycle on different compartments, in relation to traditional phases of the cycle; (v) develop the assay based on the use of terminal deoxynucleotidyl transferase (TUNEL) to detect DNA fragmentation during apoptosis, to identify apoptotic cells; (vi) develop the use of fluorochrome labeled caspase inhibitors (FLICA) assay to identify apoptotic cells with activated caspases; (vii) to apply the phospho-specific antibodies to detect phosphorylation of histone H2AX and Ataxia Telangiectasia Mediated (ATM) protein kinase, the reporters of DNA damage by endogenous oxidants or by different exogenous mutagens including anticancer drugs, in relation to the cell cycle phase; (viii) use the multiparameter cytometry to concurrently measure activation of mTOR signaling and DNA damage to assess potential gero-suppressive properties of different agents.