2010 Winner: Leyla Kocgozlu

We are pleased to announce that the winner of the 2010 JCS Prize is Leyla Kocgozlu, for her paper entitled 'Selective and uncoupled role of substrate elasticity in the regulation of replication and transcription in epithelial cells' (Kocgozlu et al., 2010). The $1000 prize is awarded annually to a junior researcher who is the first author of the paper that is judged by the Editors and Editorial Board to be the best published in the Journal that year. To be considered for the prize, the first author must be a student or a postdoc of no more than five years' standing.

Leyla is from Strasbourg, France, and she graduated with a Masters in Molecular and Cellular Biology from the University of Strasbourg. In 2006, as an undergraduate, she worked in the Institute of Dr Jean-Claude Voegel (Inserm UMR 977, Biomaterials and Tissue Engeneering), in the group of Prof. Henri Tenenbaum (Faculty of Dental Surgery). She studied the molecular mechanisms involved in periodontal pathology and atherosclerosis induced by endothelial and epithelial cells stimulated with LPS.

In 2007, Leyla entered the PhD program in Nanoassemblies and Biomimetic Materials in the team of Dr Philippe Lavalle, at the University of Strasbourg, Inserm UMR 977, in collaboration with the team Macromolecular Engeneering at Interfaces headed by Prof. Pierre Schaaf, ICS, UPR22, CNRS, Strasbourg. The elasticity of biological tissues has an important role in determining processes such as adhesion, migration and differentiation (Engler et al., 2006). Leyla worked on her thesis with Dr Dominique Vautier, where the main research focus was to answer how substrate elasticity influences nuclear structure and function in an epithelial cell model (PtK2 cells) with nanostructured films of tunable stiffness. This substrate is a multilayer film composed of two superposed strata, each formed with two different pairs of polyelectrolytes. Poly-L-lysine and hyaluronic acid (PLL/HA) (soft strata) and poly(styrene sulfonate) and polyallylamine (PSS/PAH) (hard strata). The rigidity of the film $(PLL/HA)_{24}$–$(PSS/PAH)_n$ increases with the number n of layer pairs deposited. The apparent Young's moduli are 0, 50, 200 and 500 kPa for n= 0, 2, 5 and 12, respectively (Francius et al. 2007). Leyla showed that actin stress fibres and focal adhesions (FAs) are absent for elasticities between 0 and 50 kPa. At these elasticities, the DNA replication is also inhibited. FA dynamics and cell cycle are linked. At 200 kPa, Rac1 (a protein of the small GTPase Ras family) is responsible for the formation of focal contacts, assembly of actin fibers and, subsequently, initiation of replication. The elasticity of 50 kPa allows histone H3 hyperacetylation, which permits active transcription and nucleocytoplasmic transport of the protein hnRNP A1 independently of the actin cytoskeleton. These results reveal a selective and uncoupled contribution from substrate elasticity to the regulation of replication and transcription activities in an epithelial cell model. Leyla is also studying how cells respond to matrix elasticity during mitosis.

To further develop her scientific career, Leyla is going to join the Mechanobiology Institute in Singapore (director Prof. Michael Sheetz) as a research postdoctoral fellow in the team of Prof. Benoit Ladoux.

Fiona Watt (Editor-in-Chief)

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