Nencki Institute of Experimental Biology

Team of Prof. Katarzyna Kwiatkowska awarded with Division II PAS prize

2019-01-07

II Division of Biological and Agricultural Sciences, Polish Academy of Sciences, awarded the team from the Nencki Institute, led by Prof. Katarzyna Kwiatkowska (Laboratory of Molecular Membrane Biology), for outstanding scientific achievements.

The prize was awarded to: prof. dr hab. Katarzyna Kwiatkowska, dr inż. Anna Ciesielska, dr inż. Anna Hromada-Judycka, dr Agnieszka Płóciennikowska, dr inż. Justyna Sobocińska, mgr inż. Gabriela Traczyk for the series of publications entitled : **The role of plasma membrane and endosome lipids in pro-inflammatory signaling triggered by lipopolysaccharide.**

The research conducted by the award winning team focuses on molecular mechanisms through which lipids, such as palmitic acid and cholesterol, modulate pro-inflammatory signaling cascades triggered in macrophages by lipopolysaccharide. Lipopolysaccharide (LPS, endotoxin) is a structural component of Gram-negative bacteria that induces strong pro-inflammatory responses of immune cells. An exaggerated reaction to LPS during infection leads to a systemic inflammatory reaction called sepsis. In addition, a prolonged low grade inflammation, caused among others by a high-fat diet, contributes to the development of certain metabolic and cardiovascular diseases.

The team's research allowed to determine, that an important element controlling the pro-inflammatory signaling triggered by LPS, consists in a dynamic modification of selected proteins by attaching palmitic acid residue to them. A proteomic analysis carried out by the team, led to the detection that among those palmitoylated proteins, are enzymes involved in the phosphatidylinositol cycle. Those changes determine an effective production of pro-inflammatory cytokines induced by LPS. It was also found that the proper organization of cell membranes in macrophages, which depends on the relation of cholesterol and a unique endosomal lysophospholipid, bis(monoacylglycero)phosphate, is equally important to the pro-inflammatory responses to LPS. Dysregulation of pro-inflammatory signaling by lipids present in our diet may lead to excessive production of cytokines, underlying sepsis and some civilization diseases.

The awards of Polish Academy of Sciences Divisions are granted annually for particularly important research findings published in prestigious scientific journals.