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EVOLUTIONARY IMMUNOLOGY – INTRODUCTION

One of the founders of the comparative/evolutionary immunology was the Nobel Prize winner from 1908, Ilya Metchnikoff, whose crucial observations of phagocytosis and inflammation came from research on various invertebrate and vertebrate species (see *At the sources of immunology*). Following early pioneer discoveries, majority of XX century immunologists focused on human immunity and performed experiments mainly on traditional model species among mammals (mainly rodents) and birds. In twenty's century, the anthropocentric immunologists made a number of important discoveries in understanding the vertebrate immune system, that consists of the specific adaptive immunity connected with lymphocytes with discriminatory TCR and BCR/Ig receptors. Such lymphocyte/antibody mediated system is unique for jawed vertebrates and cooperates with their 'non-specific' innate immunity, inherited from invertebrate ancestors. These discoveries led to the crucial achievements of twenty's century medicine, i.e. vaccination and transplantation. At the same time, a shadow face of vertebrate immunity has been gradually disclosed, namely allergy and autoimmunity.

In parallel, some immunologists, joined in the International Society of Developmental and Comparative Immunology, have focused on non-classical experimental models among so called 'lower' vertebrates and plethora of invertebrate species. A zoologist, Jules A. Hoffmann, discovered the Toll re-

ceptors of the fly *Drosophila melanogaster*, which became a prototype of the omnipresent Toll-like receptors (TLRs), involved in immunity of animals and plants. This milestone in understanding the potency of the innate immune system awarded the Nobel Prize in 2011. The invertebrates, despite the lack of vertebrate-specific lymphocyte-mediated machinery, proved to be very efficient in protection of self-integrity using highly variable elements of innate immunity, and finally exhibiting adaptive features.

The papers in this issue of KOSMOS highlight only some aspects of evolution of immunity. Each of invited authors from several Polish scientific centers focused on his/her favorite aspects of immunology, addressing either immunity of particular invertebrate or vertebrate species (see *Invertebrates*, and *Vertebrates*, respectively) or describing certain mechanisms or phenomena from comparative/evolutionary perspective (see *Comparative view*). We are deeply grateful to all of them.

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