



Editorial

Advances in NK cell bio



NK cells were identified almost 50 years ago as a population of lymphocytes that could kill non-self and certain virally infected or tumorigenic targets “naturally”, i.e. seemingly without antigen restriction. The prescient missing-self hypothesis, namely that NK cell function could be regulated by the expression of MHC class I, was later biologically validated and has since been expanded to include licensing and education mechanisms (Ljunggren and Karre, 1990; Karlhofer, Ribaud et al. 1992; Karre, 2002; Fernandez, Treiner et al. 2005; Kim, Poursine-Laurent et al. 2005; Anfossi, Andre et al. 2006). Better understanding of NK cell function subsequently led to seminal studies describing the importance of MHC genetics in transplantation, HIV susceptibility and tumor progression (Ruggeri, Capanni et al. 2002; Cichocki, Verneris et al. 2016; Scully and Alter, 2016; Cooley, Parham et al. 2018). Further, their importance in human health and disease has also been illustrated by rare individuals in which NK cells are missing or non-functional and the accompanying susceptibility to viral infections that is manifested in the absence of NK cell activity (Orange, 2006; Mace and Orange, 2019). These advances have been accompanied by increased understanding of the relationship between conventional NK cells and other members of the ILC family, the formation and function of adaptive and memory NK cells, and increasingly resolved understanding of how NK cells develop, acquire function, and mediate their important roles in the immune response. More recently, the promise of NK cells as a powerful tool for immunotherapy has driven increased insight into NK cell biology and how NK cell effector and regulatory functions can be harnessed for safe and effective therapeutic applications (Rezvani and Rouse, 2015; Miller and Lanier, 2019).

This Special Issue on Advances in NK Cell Biology highlights recent advances and insights into NK cell molecular function, with a particular focus on human NK cells. We are pleased to include reviews on emerging areas of importance in NK cell biology, including NK cell metabolism (Kobayashi and Mattarollo, 2017, this issue), the regulation of NK cell development and function by microRNAs (Saultz, Freud et al. 2018, this issue), and the importance of JAK/STAT signaling in human NK cell homeostasis and development (Vargas-Hernandez and Forbes, 2019, this issue). Recent advances in understanding of the role of murine MHC class Ib in NK cell development and activation are also presented (Goodall, Nguyen et al. 2018, this issue). We also feature original research articles that bring new and interesting views of human NK cell function, including the description of how KIR-HLA interactions can shape NK cell response in multiple sclerosis (Banerjee, Pang et al. 2018, this issue) and the identification of novel Id2 binding partners through the generation of new antibody tools (Rautela, Dagley et al. 2018, this issue). Finally, commonly used human NK cell lines are examined with fresh perspective through the comprehensive profiling of their gene and protein expression (Gunesch, Angelo et al. 2018, this issue).

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This is an exciting time for the field of NK cell biology. The potential for NK cells as therapeutic tools is accompanied by a deeper understanding of the nuances of innate immune cell biology and function. With this special issue, we are delighted to bring these articles to the readers of Molecular Immunology as they represent cutting-edge insight into the function, regulation and importance of these key innate immune effector cells.

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