



LABORATORY OF

## ADAPTIVE IMMUNITY

Immunity, T cells, signalling, disease models

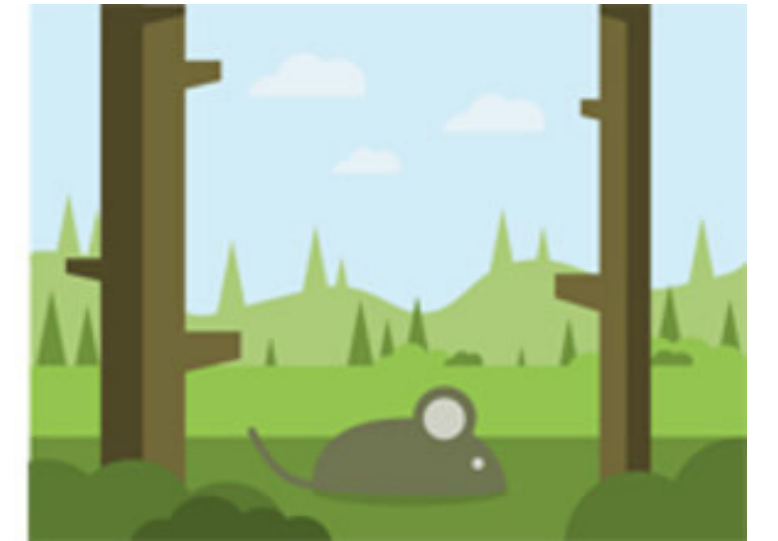
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In the picture: 1. Prasai Avishek | 2. Cupák Ladislav | 3. Uleri Valeria | 4. Andreyeva Arina | 5. Kratochvílová Anna | 6. Janušová Šárka | 7. Mašková Kristýna | 8. Paprčková Darina | 9. Cesneková Michaela | 10. Neuwirth Aleš | 11. Sprague Carly | 12. Tsyklauri Oksana | 13. Štěpánek Ondřej | 14. Huranová Martina | 15. Ivashchenko Olha | 16. Cimermanová Veronika | 17. Niederlová Veronika | 18. Michálik Juraj

We consider T cells as the most fascinating cells in our bodies. Unlike the vast majority of other somatic cells, each T cell is genetically unique, because it shuffles the pieces of DNA that encode its antigenic receptor. It means that each single T cell has its unique antigenic receptor with a unique specificity. We can compare the T cells to an army of soldiers, each of them carrying a unique weapon used in a specific situation. When the organism is infected with a pathogen, there are always a couple of T cells with the right weapon/receptor that initiate the adaptive immune response. On the other hand, too much of T-cell reactivity might induce friendly fire, or autoimmunity in immunological terms.

We elucidate how T cells make the proper fate decisions to elicit a potent immune protection and maintain self-tolerance at the same time. Our current research projects focus on the mechanisms of T-cell signalling via antigenic and germ-line encoded receptors, characterization of particular T-cell subsets, and mechanisms of signalling induced by a prominent T-cell cytokine, IL-17. Moreover, we study the biology of a protein complex called BBSome in immune cells and ciliated cells, to understand a rare disease called Bardet-Biedl Syndrome.



Impact of antigenic exposure on the immune system

### Selected publications:

1. Knizkova D, Pribikova M, Draberova H, Semberova T, Trivic T, Synackova A, Ujevic A, Stefanovic J, [Drobek A](#), [Huranova M](#), [Niederlova V](#), [Tsyklauri O](#), [Neuwirth A](#), [Tureckova J](#), [Stepanek O\\*](#), [Draber P\\*](#): CMTM4 is a subunit of the IL-17 receptor and mediates autoimmune pathology. *Nat Immunol* 2022 23: 1644-1652
2. [Paprcikova D](#), [Niederlova V](#), [Moudra A](#), [Drobek A](#), [Pribikova M](#), [Janusova S](#), [Schober K](#), [Neuwirth A](#), [Michalik J](#), [Huranova M](#), [Horkova V](#), [Cesnekova M](#), [Simova M](#), [Prochazka J](#), [Balounova J](#), [Busch DH](#), [Sedlacek R](#), [Schwarzer M](#), [Stepanek O\\*](#): Self-reactivity of CD8 T-cell clones determines their differentiation status rather than their responsiveness in infections. *Front Immunol* 2022 13: 1009198.
3. [Tsyklauri O](#), [Niederlova V](#), [Forsythe E](#), [Prasai A](#), [Drobek A](#), [Kasperek P](#), [Sparks K](#), [Trachtulec Z](#), [Prochazka J](#), [Sedlacek R](#), [Beales P](#), [Huranova M\\*](#), [Stepanek O\\*](#): Bardet-Biedl Syndrome ciliopathy is linked to altered hematopoiesis and dysregulated self-tolerance. *EMBO Rep* 2021, e50785.
4. [Draberova H](#), [Janusova S](#), [Knizkova D](#), [Semberova T](#), [Pribikova M](#), [Ujevic A](#), [Harant K](#), [Knapkova S](#), [Hrdinka M](#), [Fanfani V](#), [Stracquadanio G](#), [Drobek A](#), [Ruppova K](#), [Stepanek O\\*](#), [Draber P\\*](#): Systematic analysis of the IL-17 receptor signalosome reveals a robust regulatory feedback loop. *EMBO J* 2020, e104202.
5. [Horkova V](#), [Drobek A](#), [Mueller D](#), [Gubser C](#), [Niederlova V](#), [Wyss L](#), [King CG](#), [Zehn D](#), [Stepanek O\\*](#): Dynamics of the Coreceptor-LCK Interactions during T Cell Development Shape the Self-Reactivity of Peripheral CD4 and CD8 T Cells. *Cell Rep* 2020 30(5): 1504-1514.e7.