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RESEARCH AREA

How does our immune system distinguish between billions of molecules? What are the main determinants of immune recognition? What factors explain that certain people are more likely to get infections or cancer, while others are protected from these diseases? My research group aims to answer these questions. We focus on the adaptive immune system, which recognizes specific molecular motifs of pathogens, cancer and our self-cells. While this system is extremely complicated, it is controlled by some less complicated laws, which we intend to characterize in detail. For example, while one would expect that the immune system is more likely to recognize molecular motifs that are highly dissimilar to our self-molecules, we showed that overly high dissimilarity hinders immune recognition. Moreover, adaptive immune recognition is largely influenced by diverse genetic factors resulting in variable susceptibility to infections, cancer and autoimmune diseases. If you would like to take part in untangling the complexity of adaptive immune recognition, don't hesitate to join us!

TECHNIQUES AVAILABLE IN THE LAB

Data science; Modern statistical methods; Programming; Big data analysis; Advanced data visualization; Machine learning

SELECTED PUBLICATIONS

Koncz, B., Balogh, G. M., Papp, B. T., Asztalos, L., Kemény, L., & **Manczinger, M.** (2021). Self-mediated positive selection of T cells sets an obstacle to the recognition of nonself. *Proceedings of the National Academy of Sciences* **118**: e2100542118.

Manczinger, M., Koncz, B., Balogh, G. M., Papp, B. T., Asztalos, L., Kemény, L., Papp, B. & Pál, C. (2021). Negative trade-off between neoantigen repertoire breadth and the specificity of HLA-I molecules shapes antitumor immunity. *Nature Cancer* **2**: 950-961.

Manczinger, M., Boross, G., Kemény, L., Müller, V., Lenz, T. L., Papp, B., & Pál, C. (2019). Pathogen diversity drives the evolution of generalist MHC-II alleles in human populations. *PLoS biology* **17**: e3000131.

Manczinger, M., Kemény, L. (2018). Peptide presentation by HLA-DQ molecules is associated with the development of immune tolerance. *PeerJ* **6**: e5118.