Katedry biochémie a genetiky PriF UK
a občianske združenie *NATURA*

Vás pozývajú na 137. prednášku v rámci Kuželových seminárov:

dr. Giulia Manina

Head of Microbial Individuality and Infection Research Unit,
Institut Pasteur, Université Paris Cité, Paris, France

FUNCTIONAL RELEVANCE OF MYCOBACTERIAL PHENOTYPIC VARIATION

ktorá sa uskutoční **10. novembra 2025** (pondelok) o **15:30**
v miestnosti **CH1-222** Prírodovedeckej fakulty UK

http://www.naturaoz.org/seminare.html
http://www.naturaoz.org/KuzeloveSeminare.html

Hostiteľka: prof. Katarína Mikušová

dr. Giulia Manina
https://orcid.org/0000-0001-9905-6095

2024 – Head of Microbial Individuality & Infection Research Unit, *Institut Pasteur*, *Université Paris Cité*, Paris, France
2024 – Appointment as Research Director (*DR*), Institut Pasteur, Paris, FR
2022 – 2024 Head of Microbial Individuality & Infection Laboratory, *Institut Pasteur*, *Université Paris Cité*, Paris, France
2017 Habilitation to Direct Research in Infectious Diseases, *Université Paris Descartes*, France
2015 – Staff Scientist, Department of Cell Biology and Infection, *Institut Pasteur*, Paris, France
2015 – 2024 Appointment as Expert Research Scientist (*CRE*), *Institut Pasteur*, Paris, France
2015 – 2022 Head of Microbial Individuality & Infection Junior Group, *Institut Pasteur*, *Université Paris Cité*, Paris, FR
2009 – 2015 Postdoc, Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland
2008 – 2009 Postdoc, *Institut Pasteur*, Paris, France
2009 PhD in Genetics and Biomolecular Sciences, University of Pavia, Italy
2005 MSc in Experimental and Applied Biology, University of Pavia, Italy
2003 BSc in Biological Sciences, University of Pavia, Italy

Synopsis of the talk:

Tuberculosis remains a major global health threat, with disease heterogeneity posing significant challenges to both diagnosis and treatment. Despite being mainly a clonal pathogen, *Mycobacterium tuberculosis* exhibits marked phenotypic variation, a trait critical for survival under diverse host microenvironments and during therapy. Our research aims to understand the mechanisms underlying this variation, including the influence of host factors and drug exposure, and its contribution to disease complexity. By using single-cell and subpopulation-based approaches, we explore how phenotypic diversity fosters persistence and drug tolerance and how it can be targeted therapeutically. I will present both published and unpublished work illustrating approaches to either decrease cell-to-cell variation to enhance drug susceptibility or leverage single-cell insights to selectively target stress-responsive bacilli. Ultimately, understanding mycobacterial phenotypic variation can inform unconventional diagnostic and therapeutic strategies, offering new opportunities for improved control of tuberculosis and other bacterial infections.

Selected publications:

First author; **#Corresponding author; Lab members.*

Mistretta M, Cimino M, Campagne P, Volant S, Kornobis E, Hebert O, Rochais C, Dallemagne P, Lecoutey C, Tisnerat C, Lepailleur A, Ayotte Y, LaPlante SR, Gangneux N, Záhorszká M, Korduláková J, Vichier-Guerre S, Bonhomme F, Pokorny L, Albert M, Tinevez JY, **#**Manina G. (**2024**) Dynamic microfluidic single-cell screening identifies pheno-tuning compounds to potentiate tuberculosis therapy. **Nat Commun**. 15(1):4175. doi: 10.1038/s41467-024-48269-2. PMID: 38755132.

Mistretta M, Gangneux N, **#**Manina G. (**2022**) Microfluidic dose-response platform to track the dynamics of drug response in single mycobacterial cells. **Sci Rep**. 12(1):19578. doi: 10.1038/s41598-022-24175-9. PMID: 36379978.

Griego A, Douché T, Gianetto QG, Matondo M, **#**Manina G. (**2022**) RNase E and HupB dynamics foster mycobacterial cell homeostasis and fitness. **iScience.** 25(5):104233. doi: 10.1016/j.isci.2022.104233. PMID: 35521527.

#Manina G*****, Dhar N, McKinney JD. (**2015**) Stress and host immunity amplify *Mycobacterium tuberculosis* phenotypic heterogeneity and induce nongrowing metabolically active forms. **Cell Host Microbe**. 17(1):32-46. doi: 10.1016/j.chom.2014.11.016. PMID: 25543231.

Makarov V*****, Manina G*****, Mikusova K*****, Möllmann U*****, Ryabova O, Saint-Joanis B, Dhar N, Pasca MR, Buroni S, Lucarelli AP, Milano A, De Rossi E, Belanova M, Bobovska A, Dianiskova P, Kordulakova J, Sala C, Fullam E, Schneider P, McKinney JD, Brodin P, Christophe T, Waddell S, Butcher P, Albrethsen J, Rosenkrands I, Brosch R, Nandi V, Bharath S, Gaonkar S, Shandil RK, Balasubramanian V, Balganesh T, Tyagi S, Grosset J, Riccardi G, Cole ST. (**2009**) Benzothiazinones kill *Mycobacterium tuberculosis* by blocking arabinan synthesis. **Science**. 324(5928):801-4. doi: 10.1126/science.1171583. PMID: 19299584.