

13th Summer Academy “Infection and Immunity”
Lecture 4 on Wednesday, 21 August 2024

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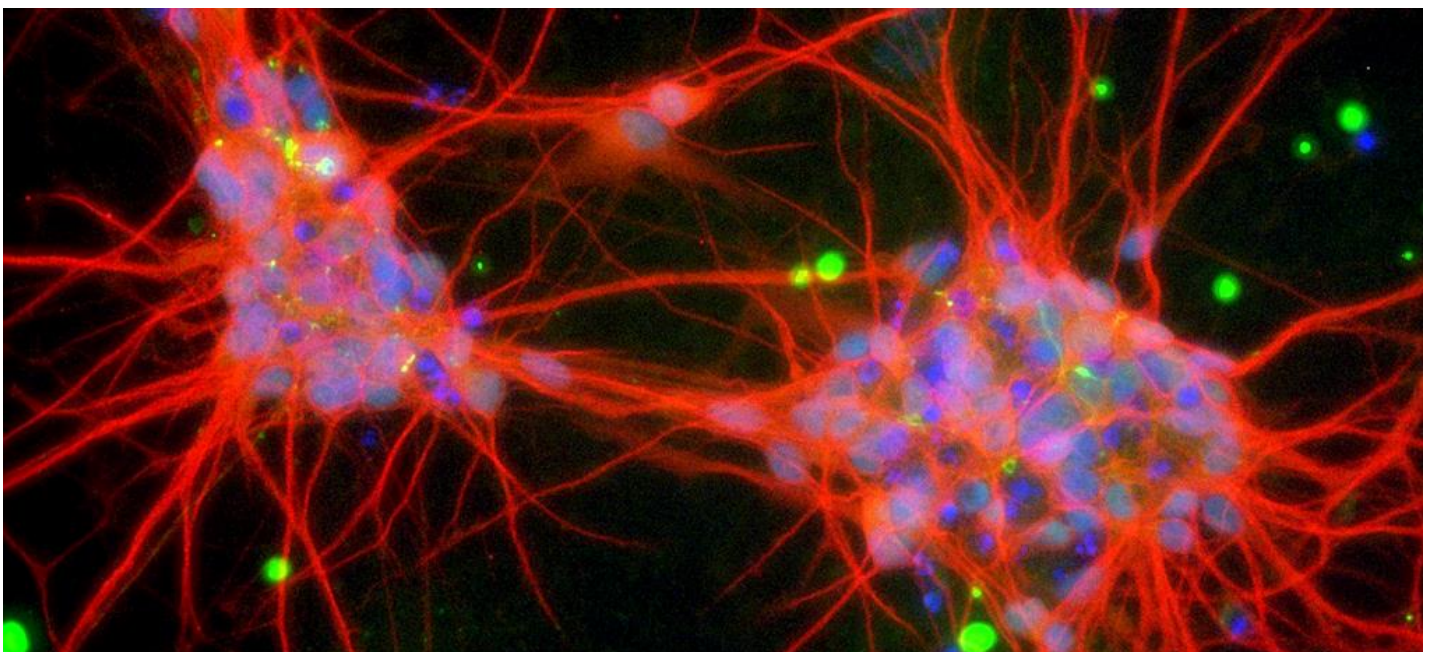
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“Whole organ quantitative biology with light sheet microscopy uncovers healthy and pathologic physiology with unprecedented detail”

A lecture on 3D microscopic techniques in science and for clinical diagnosis



Publications for seminar preparation:

Tuz, A. A. et al. Stroke and myocardial infarction induce neutrophil extracellular trap release disrupting lymphoid organ structure and immunoglobulin secretion. *Nature Cardiovascular Research*, doi:10.1038/s44161-024-00462-8 (2024).

Henneberg S, Hasenberg A, Maurer A, Neumann F, Bornemann L, Gonzalez Menendez I, Kraus A, Hasenberg M, Thornton CR, Pichler B, **Gunzer M***, and Beziere N* (2021). Antibody-guided in vivo imaging of *Aspergillus fumigatus* lung infections during anti-fungal azole treatment. *Nat Commun* Mar 17;12(1):1707. doi: 10.1038/s41467-021-21965-z (*shared senior authors)

Merz SF, Korste S, Bornemann L, Michel L, Stock P, Squire A, Soun C, Engel DR, Detzer J, Lörchner H, Hermann DM, Kamler M, Klode J, Hendgen-Cotta UB, Rassaf T, **Gunzer M*** and Totzeck M* (2019). Contemporaneous 3D characterization of acute and chronic myocardial I/R injury and response. *Nat Commun* 10, 2312. *shared senior authors

Grüneboom A, Grüneboom A, Hawwari I, Weidner D, Culemann S, Müller S, Henneberg S, Brenzel A, Merz S, Bornemann L, Zec K, Wuelling M, Kling L, Hasenberg M, Voortmann S, Lang S, Baum W, Ohs A, Kraff O, Quick HH, Jäger M, Landgraeber S, Dudda M, Danuser R, Stein JV, Rohde M, Gelse K, Garbe AI, Adamczyk A, Westendorf AM, Hoffmann D, Christiansen S, Engel DR, Vorkamp A, Krönke G, Herrmann M, Kamradt T, Schett G, Hasenberg A, **Gunzer M** (2019). A network of trans-cortical capillaries as mainstay for blood circulation in long bones. *Nat Metabolism* 1:236-250.

Klingberg A, Hasenberg A, Ludwig-Portugall I, Medyukhina A, Männ L, Brenzel A, Engel DR, Figge MT, Kurts C, **Gunzer M** (2017). Fully Automated Evaluation of Total Glomerular Number and Capillary Tuft Size in Nephritic Kidneys Using Lightsheet Microscopy. *J Am Soc Nephrol*, 28:452-459.

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Hasenberg A, Hasenberg M, Männ L, Neumann F, Borkenstein L, Stecher M, Kraus A, Engel DR, Klingberg A, Seddigh P, Abdullah Z, Klebow S, Engelmann S, Reinhold A, Brandau S, Seeling M, Waisman A, Schraven B, Göthert JR, Nimmerjahn F, **Gunzer M** (2015). Catchup: a mouse model for imaging-based tracking and modulation of neutrophil granulocytes, *Nat Methods*, 12:445-452.

Neumann J, Riek-Burchardt M, Herz J, Doeppner TR, König R, Hütten H, Etemire E, Männ L, Klingberg A, Fischer T, Görtler MW, Heinze HJ, Reichardt P, Schraven B, Hermann DM, Reymann KG, **Gunzer M** (2013). Very-late-antigen-4 (VLA-4)-mediated brain invasion by neutrophils leads to interactions with microglia, increased ischemic injury and impaired behavior in experimental stroke. *Acta Neuropathol*, 129:259-277.

Reichardt P, Patzak I, Jones K, Etemire E, **Gunzer M***, Hogg N* (2013). A role for LFA-1 in delaying T lymphocyte egress from lymph nodes. *EMBO J*, 32:843. *shared senior authors

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Bruns S, Kniemeyer O, Hasenberg M, Amanianda V, Nietzsche S, Thywissen A, Jeron A, Latgé JP, Brakhage AA, **Gunzer M** (2010). Production of extracellular traps against *Aspergillus fumigatus* in vitro and in infected lung tissue is dependent on invading neutrophils and influenced by hydrophobin RodA. *PLoS Pathog*, 6:e1000873.