

6. Immune Cell Migration and Invasion

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Outline of the lecture

- I. Four pillars of directed cell migration:
 1. Environmental cues (signals) which set directionality. Diversity of cues.
 2. Decoding the environment: how cells sense the cues.
 3. Transmitting the signal inside the cell: polarization of cells.
 4. Response: exerting the force to the environment that makes cells move.

- II. Invasion as a special type of migration
 1. Types of barriers that cells have to overcome *in vivo*
 - Extracellular matrix
 - Tissue cells adhered to each other (examples: blood vessel wall, epithelial tissues).
 2. Cellular mechanism to sense barriers.
 3. Mechanisms to penetrate through the barrier.

Discussion:

Lämmermann, T., Bader, B., Monkley, S. *et al.*

Rapid leukocyte migration by integrin-independent flowing and squeezing.

Nature **453**, 51–55 (2008). <https://doi.org/10.1038/nature06887>

Reviews:

SenGupta, S., Parent, C.A. & Bear, J.E. The principles of directed cell migration. *Nat Rev Mol Cell Biol* **22**, 529–547 (2021). <https://doi.org/10.1038/s41580-021-00366-6>

Extra reading:

Yamada, K.M., Sixt, M. Mechanisms of 3D cell migration. *Nat Rev Mol Cell Biol* **20**, 738–752 (2019). <https://doi.org/10.1038/s41580-019-0172-9>