Interplay between hematopoietic stem cells and the microenvironment during aging

Endosteal niches contract

- Endosteal mesenchymal stromal cells ↓
- Arteriole ↓
- Transitional zone vessel ↓
- Adipocytes ↑
- Osteoprogenitors ↓
- Bone marrow

Non-endosteal niches expand

- Th+ fiber ↑
- Capillary

Adrenergic switch: $\beta_3$-AR $\rightarrow$ $\beta_2$-AR

- HSC away from endosteal niches
- HSC with lymphoid commitment deficiency
- HSC with myeloid/megakaryocytic-biased differentiation

Aged HSCs

- Myeloid-biased HSCs
- Lymphoid-biased HSCs

Apposition

- Aged HSCs

Inflammation

- Defective phagocytosis
- CXCR4$^+$CD62L$^-$
- Macrophage
- Neutrophils ↑

Niche alterations $\rightarrow$ HSC aging

HSC aging $\rightarrow$ Niche remodeling

Ho and Méndez-Ferrer. Haematologica, 2020