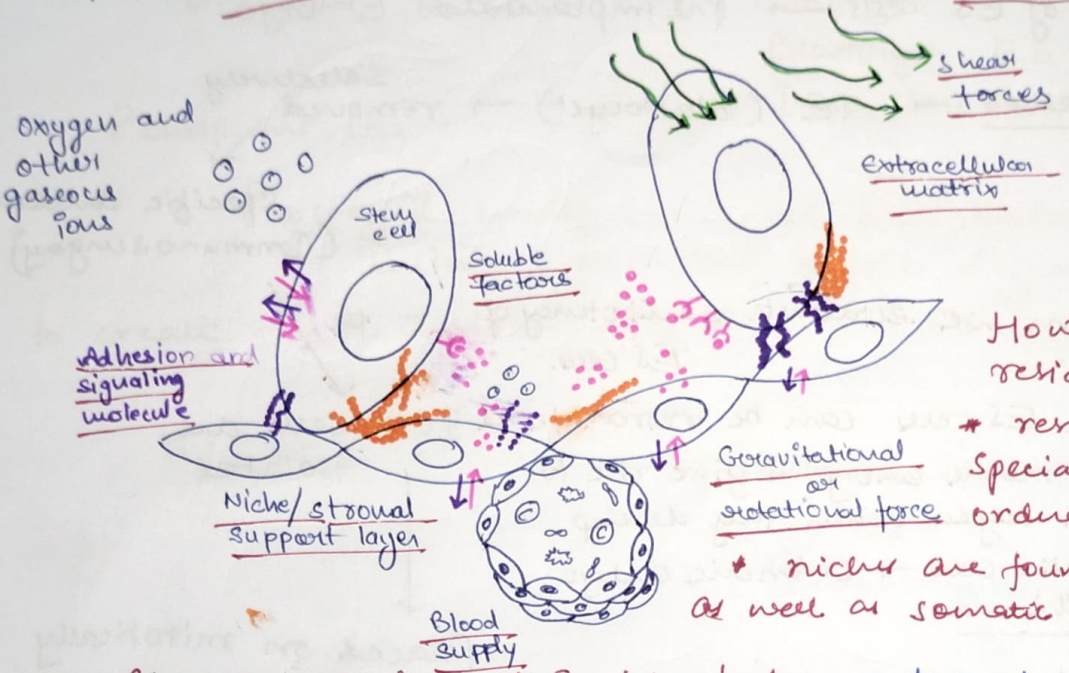
20/9/22 21/9/22

ME - microenvironment
↓
niche



How stem cell resides.

* resides in highly specialized & precisely ordered ME
* niches are found in Embryonic as well as somatic tissue.

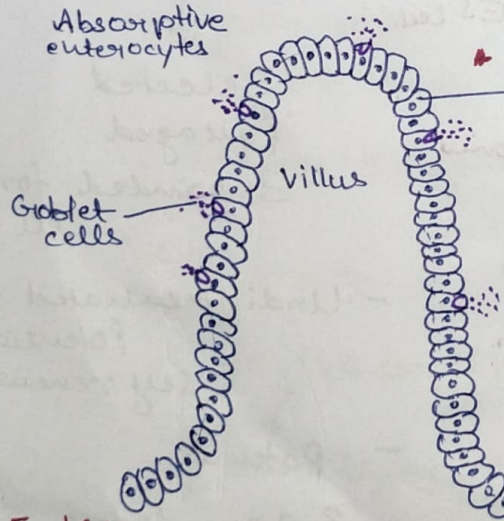
* Stem cell → interact ε niche factor. → to sustain stemness and regulate differentiation.

* Biophysical elements → Shear Stress ; Oxygen tension
  Biochemical elements → paracine ; autocrine signaling factors.

Mimic the natural microenvironment (3D platforms) ECM ; factors ; GFs ; Signaling molecules & their effect on the stem cells.

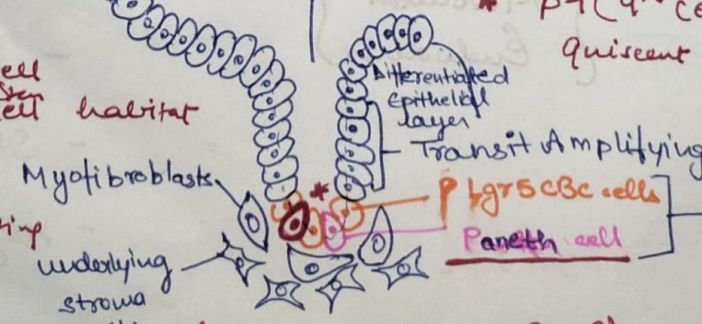
Gastric niche / Intestinal Crypt Engineering (ISC)

* ISC complicated network of cells and signaling molecules.
* base of multiple crypts within the Enteroendocrine intestinal epithelium



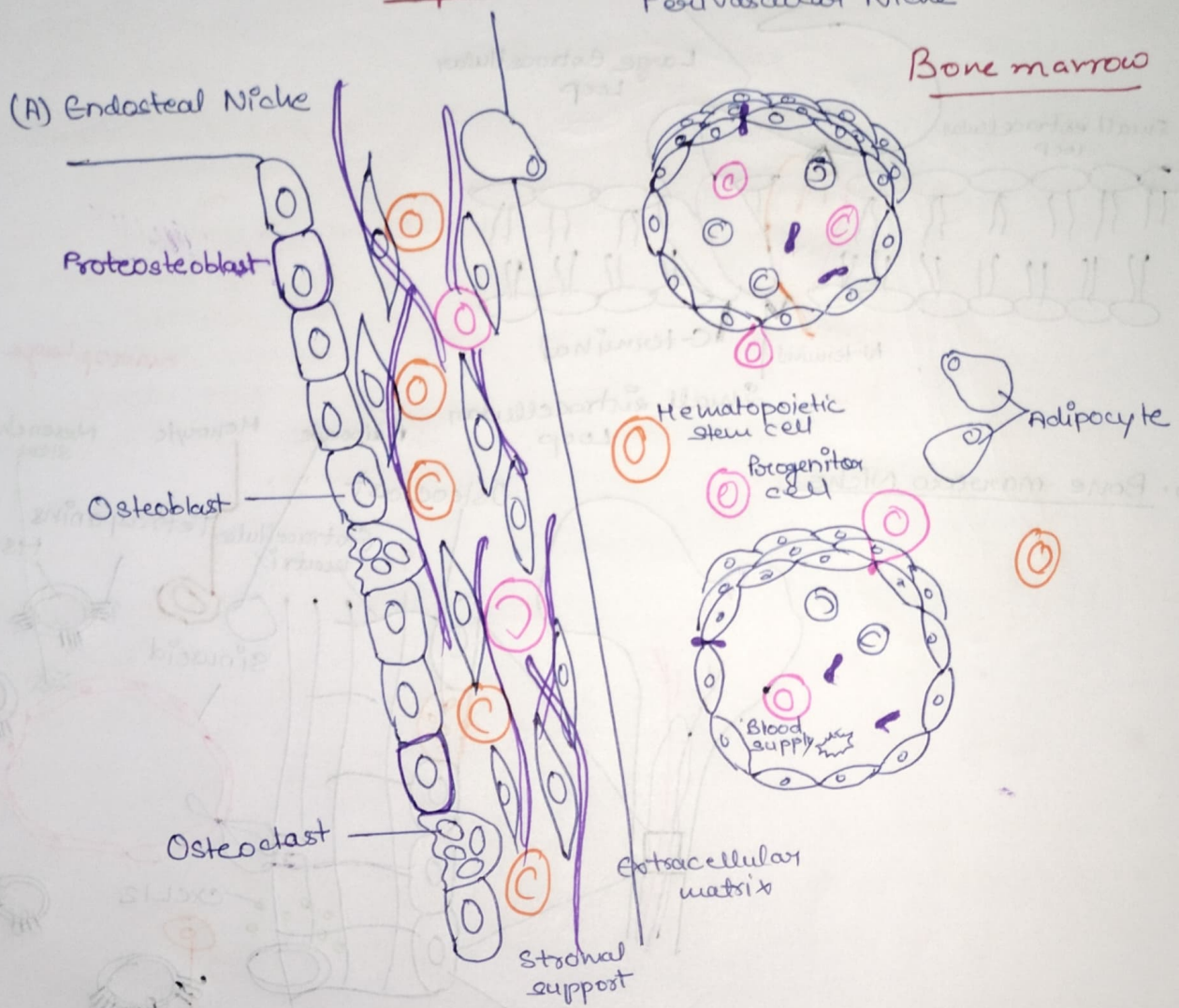
2 distinct ISCs

1. ISC expresses Lgr5 (Leucine-rich repeat containing G-protein coupled receptor 5 ⇒ a target of Wnt pathway)
   * found at Crypt base
   * flanked by Paneth cell
   * p4 (4th cell) → more quiescent ISCs



* Lgr5 ISCs → Stem cell Permissive zone → Stem cell habitat by signaling mols. produced by Paneth cells & underlying mesenchymal stromal components (fibroblast ; Immune cells ; Neural cells) (Wnt ; Notch ; BMP)

Hematopoietic niche



* All blood cells
* Bone
* Cartilage
* ligament
* Myocyte
* Adipose tissue.

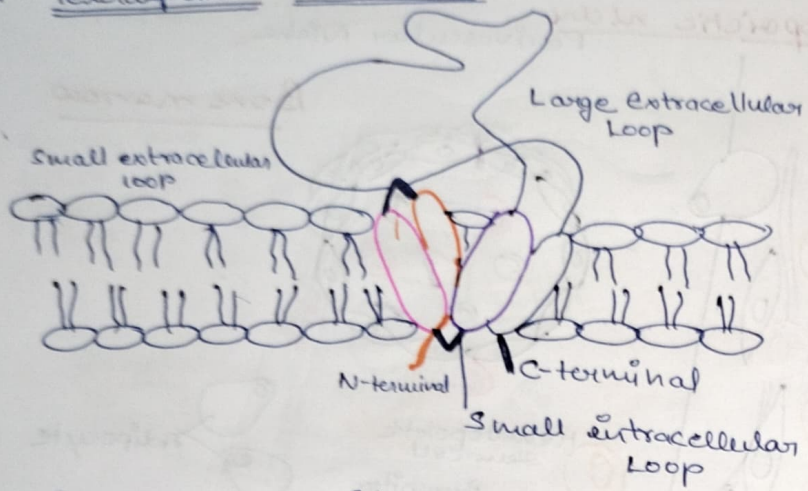
HSC. ⟶ All blood cells

MSC
Mesenchymal Stem Cell.
⇓

HSC-LT

HSC-ST

A. Tetraspanin Structure



B. Bone marrow Niche