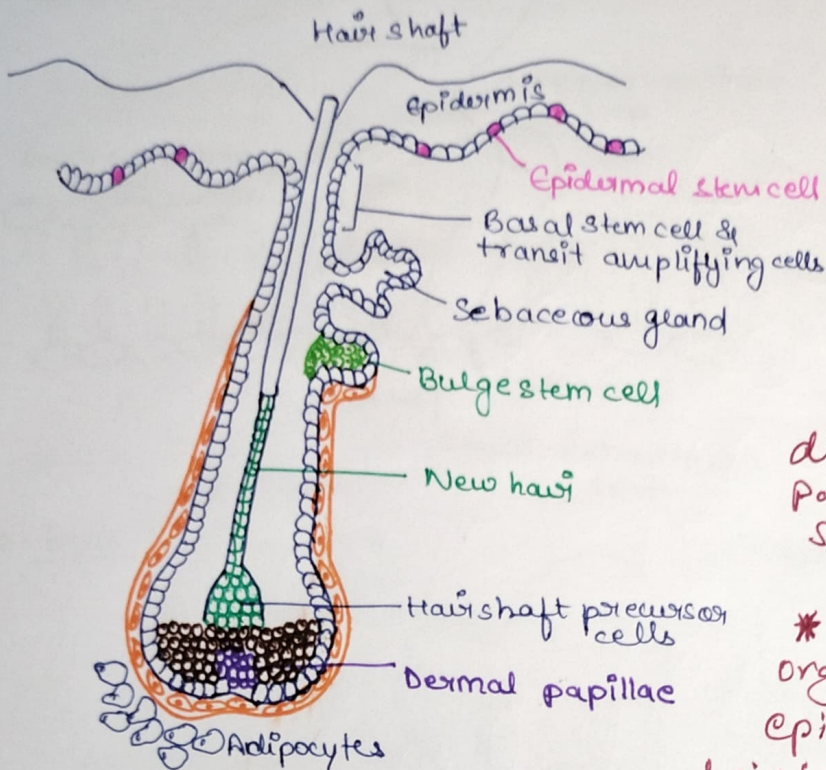


23/9/22

Skin



- * Easily regenerates
- * Abundant regenerative potential.

* Artificial skin is readily available in the market provides substitutes for diabetic foot ulcers, burn patients, wear/tear/plorbe surgery.

* Skin has intricately organised interfollicular epidermal (IFE) layer, hair follicle and sebaceous glands.

- * Highly proliferative stem cells → repair & regenerate the skin.
- * Mitotically active cells are present in IFE → differentiate and migrate outwards to generate keratinocytes.
- * Within hair follicle, stem cells reside in bulge region.
- * Stem cells are characterized by CD34; Keratin and Lgr5
- * Stem cell activation (bulge & IFE) → signals → regulatory molecules → stemness signals → stopped reduced

potency signals → upregulated.

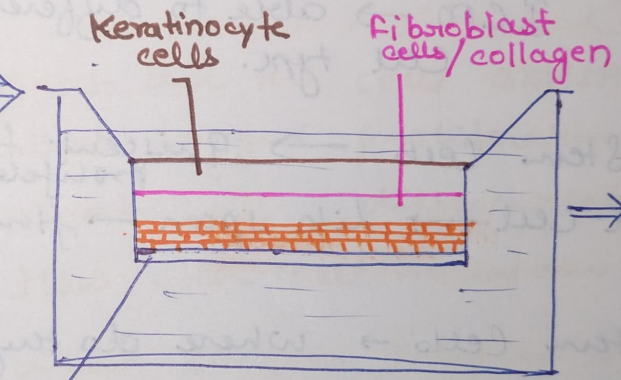
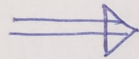
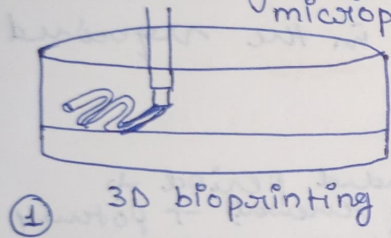
Proliferation - Inhibition BMP ↑

β-catenin ↑

FGF; Wnts; noggin → to facilitate stem cell activation.

* Epidermal growth factor →

Preparation: Cells,
collagen hydrogel
microporous
PCI
mesh



③ Characterization

② Air-liquid interface
lifting

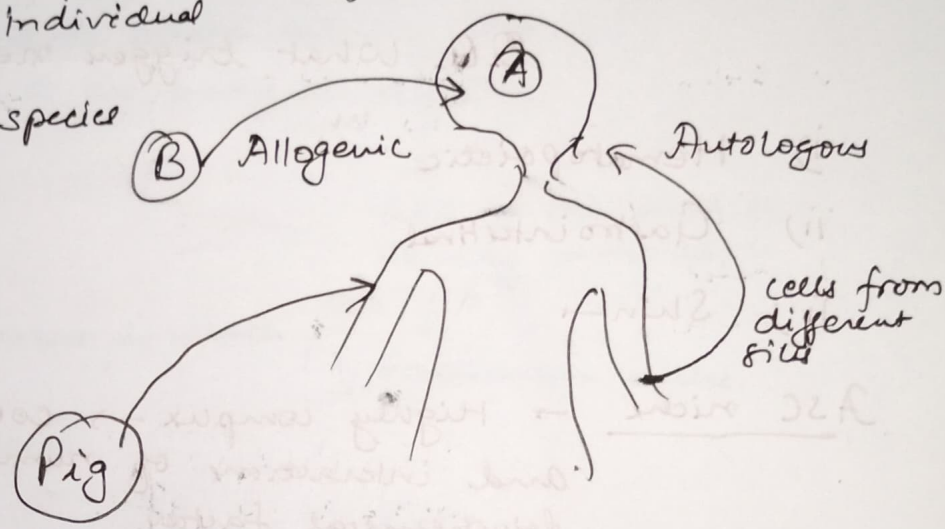
acellular layer

REGENERATION TISSUE ENGINEERING

* Repair * Replacement * for functional tissue
Substitute over defective/damaged/non-functional tissue.

SOURCE OF CELLS

- * Autologous → Same body
- * Allogenic → Same species but different individual
- * Xenogenic → different species



* Autogenic → Systemic disorder
burns
Cancer
or any other condition where cells from self are not available
Genetic disease.

- * Allogenic → when autogenic is not available
- * Xenogenic → Easily perform experiment.

① Source of Cells → (Stem cells)

Autograft is most preferred; ESCs if possible;
iPSCs if possible

- Very less chances of rejection and pathogenic transmission.

Allogenic → body of the donor.

- chances of rejection
- " " disease transmission

Xenogenic :: animal sp. pathogenic

- Rejection

- Stem cell are not readily available there they provide an option.

② Growth Factors

VEGF
EGF
FGF
TGF- β
TGF- α
NGF
PDGF

You should have informⁿ about its niche & their role.

③ Polymer Natural polymer
Scaffold Synthetic polymer.

Bone \rightarrow hydroxyapatite
tricalcium phosphate

- lack mechanical properties.

Synthetic polymer: poly glycolic acid (PGA)
poly lactic acid (PLA)
copolymer.

Natural
Collagen
Glycosaminoglycans
Alginate acid
Chitosan.

- * Biocompatible
- * Biodegradable
- * Non immunogenic
- * Injectability
- * Synthetically manufacture
- * Transparent
- * Nonscale.
- * low concⁿ
- * Reception.