

Limbal Stem cells

An eye to the future

Irish Blood Transfusion Service



GMP facility



Clean room



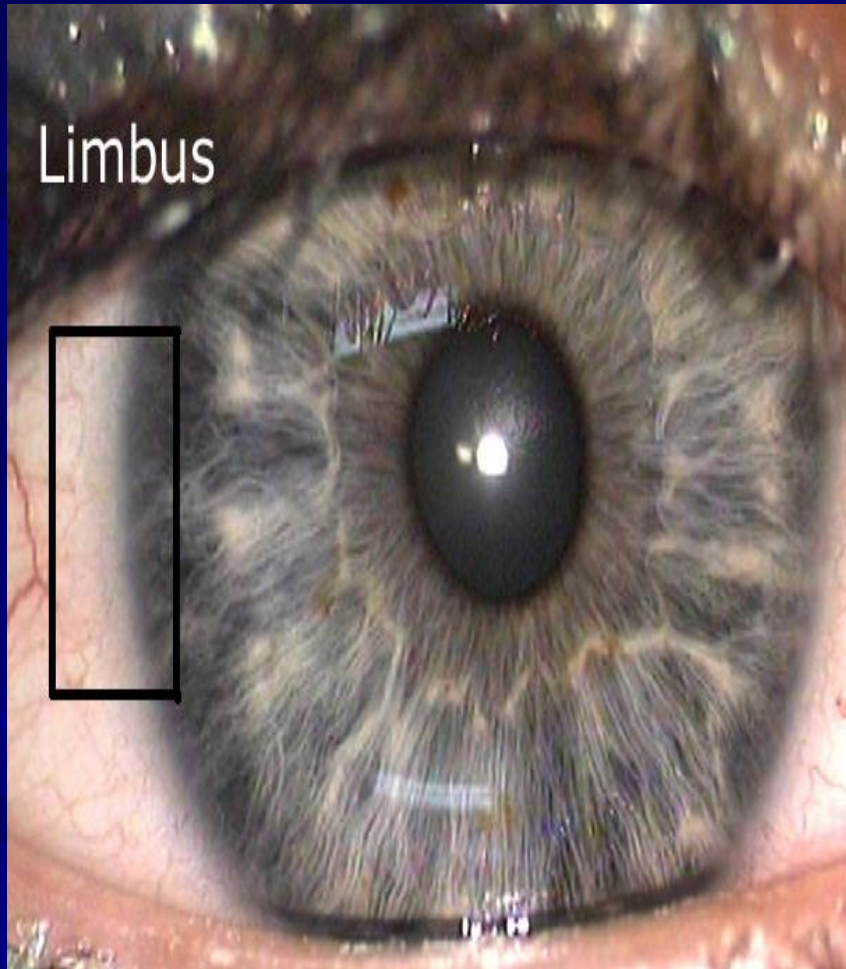
Why LSC's ?

- Operate a tissue bank with clean rooms – existing infrastructure
- Tissue banking is similar to cell therapy.
- Expertise in eye banking
- Knowledge of regulations
- Medical and scientific staff

Contents of presentation

- Location and anatomy of Limbus
- Limbal stem cell deficiency and therapy
- Culturing limbal stem cells
- Regulations
- Challenges

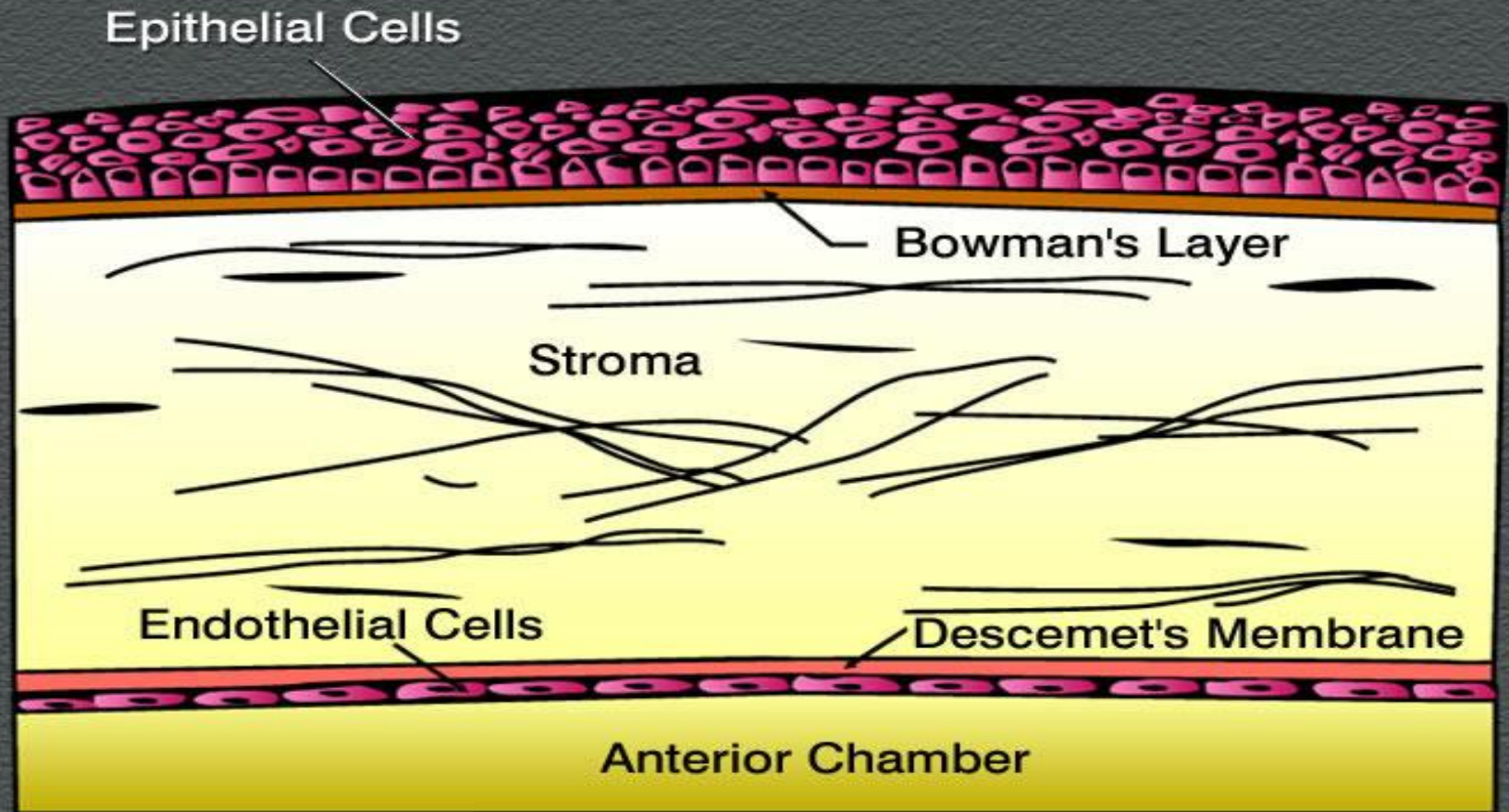
Location of the limbus



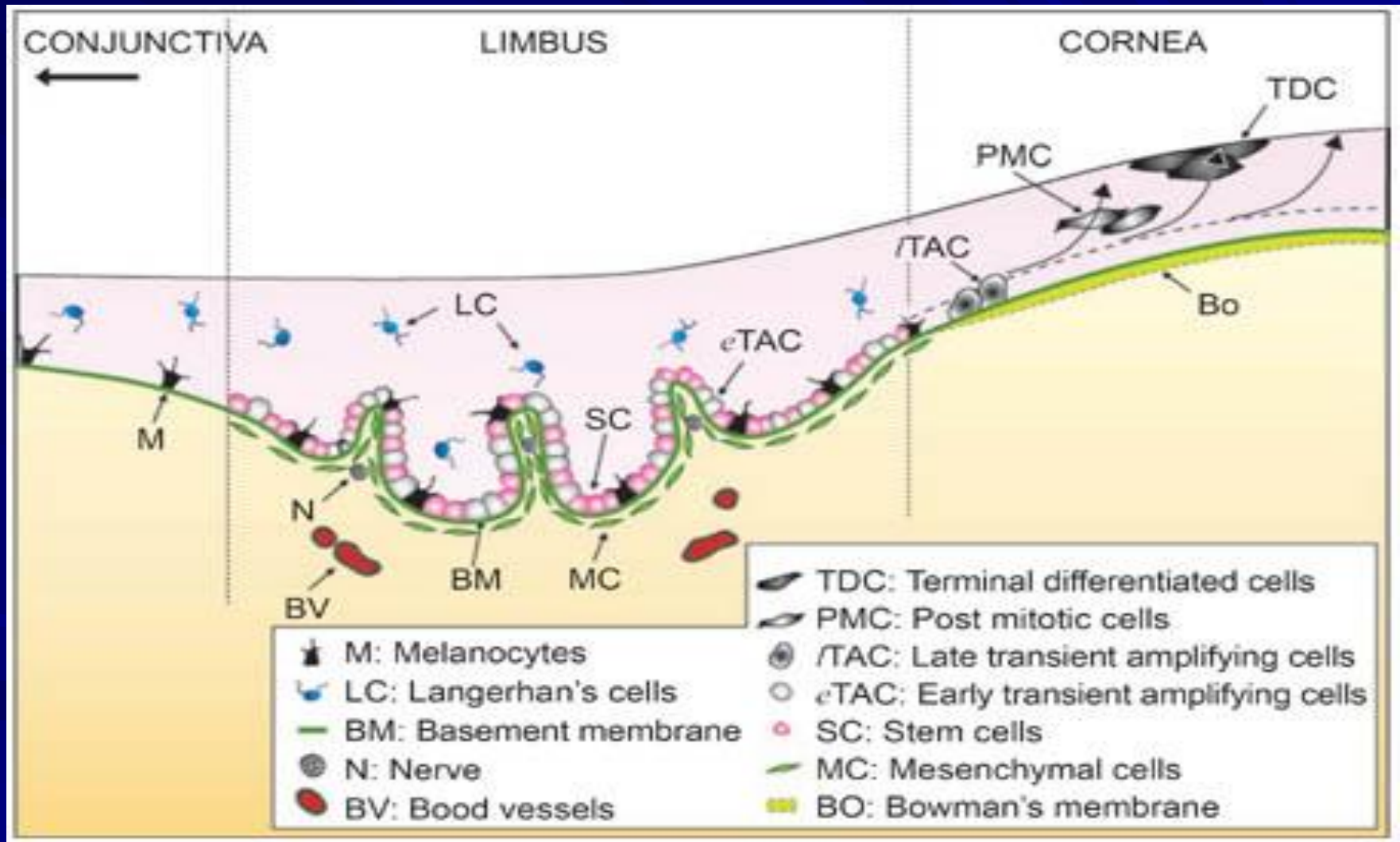
The limbus forms the border between the transparent cornea and opaque sclera.

- source of LSC
- Prevents conjunctival epithelium from spreading over the cornea.

5 Layers of the cornea



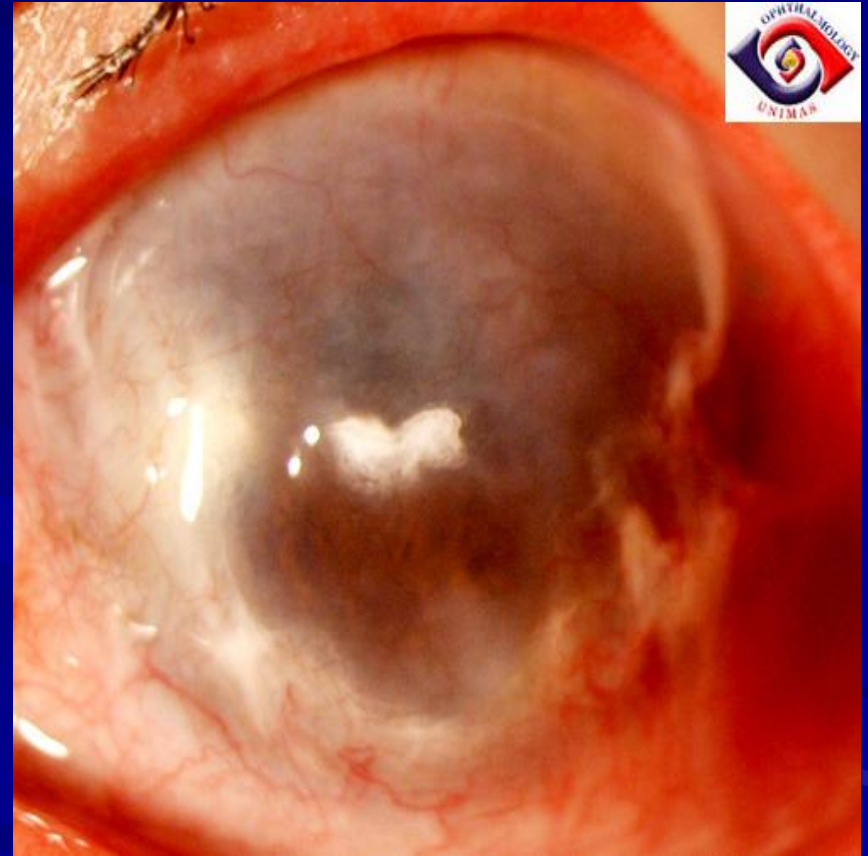
Limbus region



Limbal stem cell deficiency

- Complete loss or abnormal functioning of the LSC leads to re-epithelialisation by bulbar conjunctival cells. This is followed by:
 - stromal scarring,
 - decreased visual acuity and
 - severe discomfort.

Limbal stem cell deficiency



Limbal Stem Cell Deficiency

- LSCs constantly renew the epithelium in response to normal wear and tear.
- Loss of LSC allows conjunctival epithelial cells and blood vessels to grow over the corneal surface.
- Causes of LSC loss include thermal/chemical injury, Stevens-Johnson syndrome, aniridia, Pterygium.

Limbal stem cell therapy

- The goal of treatment is to re-integrate the cultured LSC in to the ocular surface so that the LSC will continuously replenish the corneal epithelium.
- Minimally invasive
- Success even if sight is not restored - reduction in pain.

LSC Treatment options

- Keratolimbal allograft (KLAL)- cadaveric donor.
- Ex vivo stem cell expansion.
- Donors may be autologous or allogenic
- Autograft in unilateral LSCD. Benefit is no risk of immunologic rejection; Concern is inducing LSCD in the good eye.
- Living related allograft - HLA similar