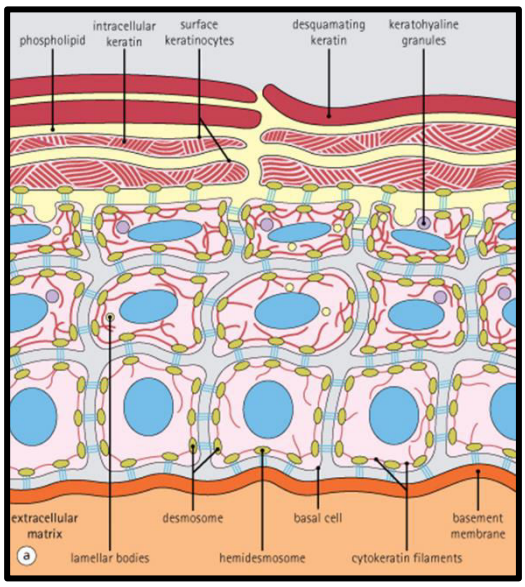
Specialisation of Epithelial Tissue

- **Keratinization** (see right)
  - Epithelia can act as a barrier against tough abrasion from chemical damage, physical damage etc.
  - **Blocking junctions prevents the diffusion of molecules between cells**
    - The apical membrane of the epithelial cells lining the urinary tract have a high number of sphingolipids
      - These resist osmotic fluid movement
    - Desmosomes and hemidesmosomes act as mechanical barrier
  - **Stratified squamous epithelial cells undergo a process called keratinization**
    - The **cytoskeleton becomes tightly condensed with other specialised proteins** and forms a resilient mass
    - This leads to the **death of the cell** which forms a **tough, impervious layer of keratin**



- **Secretory adaptations**
  - Some organelles develop more prominently than others due to an epithelial cells adaptation for secretion
    - Secretions include **enzymes, mucins and steroids**
    - **Ions can also be secreted**
  - Secretory cells have a **large nucleus** and **lots of rough endoplasmic reticulum**
    - **Mucin-secreting cells have an expanded Golgi system**
    - **Steroid-secreting cells have an extensive soft endoplasmic reticulum**
    - **Ion-pumping cells have a large surface area and lots of mitochondria**
  - Epithelial cells can be grouped into **glands** for **large amounts of a certain secretion**
    - This may involve **straight** or **coiled glands**
    - They can be divided into **specialised zones**
    - Most glands are refined and have **branching** and **acini**
    - Some glands may be:
      - Part of other tissue, such as mucus glands in the respiratory tract
      - Anatomically distinct, such as salivary glands
  - There are two types of secretion:
    - Holocrine (bottom right)
    - Merocrine (bottom left)
  - The following shows the difference between simple and compound alveolar/tubular structures: