Epithelial Tissue

- Epithelial tissue (singular: epithelium) is one of the 4 main types of tissue in the body. It lines the cavities and exposed surfaces of the body, as well as producing secretions such as saliva.
  - Epithelial cells line the digestive, respiratory, reproductive and urinary tracts as well as chest cavities, brain ventricles and the chambers of the heart.

- There are certain characteristics associated with epithelial tissue:
  - The cells are **bound tightly together by interconnections called cell junctions**
  - The cells have a ‘**polarity**’
    - They have an **exposed and attached surface**, the exposed surface is termed ‘**apical**’ and the attached surface is called ‘**basal**’
  - The base of an epithelium is bound to a thin **basal lamina/basement membrane**
    - This connects the epithelium to the underlying connective tissue
  - The cells **lack a blood supply** and so are termed **avascular**
    - This means they must **obtain their nutrients by diffusion or absorption** across either the basal or apical surface
  - Finally, when cells become lost or damaged at the exposed surface, they are **continuously replaced by the division of stem cells**

- The epithelium has a number of functions that can vary depending on its speciality:
  - It can **protect the underlying content from abrasion, dehydration or destruction**
  - It can **control the permeability** of its layer by allowing selective absorption or secretion
  - It provides **sensation** due to the **large nerve supply**
    - These specific cells are called **neuroepithelium**
  - Epithelial tissue can also produce **specialised secretions from glandular epithelia**
    - Most epithelial cells produce secretions

- Epithelial tissue can be specialised depending on its job:
  - It allows the movement of fluids over its surface to provide protection and lubrication
  - It can allow the movement of fluids through the epithelium and so controls **permeability**
  - It provides **secretions to act as physical protection or chemical messenger**
  - They can also have hair like projections and come in two ways:
    - **Microvilli**
      - Microvilli are found on epithelial tissue that **line internal passageways such as the intestinal tract**
      - They are abundant where secretion and absorption take place as they **increase the surface area of cells by ~20x**
    - **Cilia**
      - Cilia are found on **ciliated epithelial cells**
      - They **beat in a coordinated fashion** and so have **many mitochondria** for energy
      - They are **used to transport molecules such as mucus along a pathway** such as the respiratory tract

- The following is an EM of microvilli (left) compared to cilia (right)