The blood brain barrier; Structure, function and role in drug delivery

The brain capillary endothelium serve as a gateway to the brain for nutrients and solutes but also act as a barrier for endogenous as well as exogenous compounds (the blood-brain barrier, BBB) which has implications for therapeutic modalities. The barrier's structural components are endothelial cells, pericytes, astrocytes, and together with microglia and neurons form the Neurovascular Unit (NVU).

The inherent difficulty of delivering pharmaceutical compounds across the BBB due to its impermeability will be discussed. Advancements in barrier in vitro design, drug delivery strategies, including nanotechnology, bioengineered molecules, focused ultrasound, and receptor-mediated transcytosis all holds promise to accelerate CNS drug development but also have limitations, which will be treated.