The by p-glycoprotein. astrocytes have been claimed to

Environment

Theblood–brain barrier (BBB) is an invincible obstacle for large moleculespharmaceuticals (drugs, antibiotics, antineoplastic agents, nerupeptides) 1. Nanotechnology specificallynanoparticles play a great role in delivering drugs across the blood–brainbarrier.

Nanoparticles are solid colloidal particles ranging in sizefrom 1 to 1000 nm that are utilized as drug delivery agents. Nanoparticles areconsisting of various macromolecules in which therapeutic drugs can beadsorbed, entrapped, or covalently attached. Nanoparticles have ultra smallsize, large surface area to mass ratio, and high reactivity, which are uniquephysicochemical properties and different from bulk materials of the samecomposition, helps in drugs transfer across the blood–brain barrier 2. The nanoparticulate drugs ishelpful for very aggressive brain tumors.

Keywords: IntroductionThe blood–brain barrier (BBB) is ahighly selective semipermeable membrane barrier that separates the brain from thecirculating blood and alsokeeps separate the extracellular fluid in the central nervous system (CNS). The blood–brain barrier is formed bybrain endothelial cells and it allows the passage of water, some gases, and lipid-soluble moleculesby passive diffusion, as well as the selective transport of molecules suchas glucose and amino acids that are crucial to neural function. Furthermore, itprevents the entry of lipophilic potential neurotoxins by way ofan active transport mechanism mediated by P-glycoprotein.

Astrocytes have beenclaimed to be necessary to create the blood–brain barrier. Theblood–brain barrier acts very effectively to protect the brain from many commonbacterial infections. Thus, infections of the brain are very rare.

A few regions in the brain, including the circumventricular organs, do not have a blood–brain barrier. The blood–brainbarrier occurs along all capillaries and consistsof tight junctions around the capillaries that do not exist innormal circulation 3. Atthe level of the endothelial cells of the cerebral capillaries, the barrier ismainly found. It essentially comprises the major interface between the bloodand the brain. The ependymal cells surrounding the circumventricular organs ofthe brain and at the arachnoid membrane, this barrier also occurs.

4, 5. Theconstancy of the internal environment of the brain is regulated by this barrier. The composition of the extracellular fluid of the brain is largely independentof the composition of the circulating blood 1. BBB controls thisextracellular fluid composition within precise limits to provide a stableenvironment in which the integrative neuronal functions of the brain canoptimally take place 6.

The brain blood vessel endothelial cells are characterizedby having tight continuous circumferential junctions between them thusabolishing any aqueous paracellular pathways between these cells 7. The presence of thetight junctions and the lack of pathways between cells greatly restricts the movementof polar solutes across the cerebral endothelium 6.