Neuroimmunomodulation. 1995 Jul-Aug;2(4):241-8.

Passage of cytokines across the blood-brain barrier.

One mechanism by which blood-borne cytokines might affect the function of the central nervous system (CNS) is by crossing the blood-brain barrier (BBB) for direct interaction with CNS tissue. Saturable transport systems from blood to the CNS have been described for interleukin (IL)-1 alpha, IL-1 beta, IL-1 receptor antagonist (IL-1ra), IL-6, and tumor necrosis factor-alpha (TNF-alpha). Blood-borne cytokines have been shown to cross the BBB to enter cerebrospinal fluid and interstitial fluid spaces of the brain and spinal cord. IL-2 does not cross the BBB by a saturable transport system. The blood-to-brain uptakes of IL-1 alpha, IL-beta, and IL-1ra are interrelated for most brain sites, but the posterior division of the septum shows selective uptake of blood-borne IL-1 alpha. The saturable transport systems for IL-6 and TNF-alpha are distinguishable from each other and from the IL-1 systems. The amount of blood-borne cytokines entering the brain is modest but comparable to that of other water-soluble compounds, such as morphine, known to cross the BBB in sufficient amounts to affect brain function. CNS to blood efflux of cytokines has also been shown to occur, but the mechanism of passage is unclear. Taken together, the evidence shows that passage of cytokines across the BBB occurs, providing a route by which blood-borne cytokines could potentially affect brain function.