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Mast cells: the immune gate to the brain.

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Mast cells were originally considered wandering histiocytes, but are now known to derive from the bone marrow and enter the tissues as immature or precursor cells which then differentiate under micro-environmental influences such as interleukin-3. At least three types of mature mast cells have been identified: serosal (lung, peritoneal, skin), mucosal (nasal, gastrointestinal) and brain (dural, perivascular, parenchymal) with their own distinct biochemical, morphological and functional characteristics. Mast cells are necessary for immediate hypersensitivity reactions where they release numerous biologically powerful mediators in response to immunoglobulin E (IgE) and antigen (Ag), and appear to be required for delayed reactions. Anaphylatoxins, basic peptides and drugs, as well as certain neuropeptides and hormones, can also trigger mast cell secretion. Recent evidence indicates that mast cells are found in close proximity to neurons, an association which may be regulated by nerve growth factor. Moreover, mast cells may be capable of selective release of mediators which could, in turn, regulate further secretion. This information suggests that mast cells may serve as a link between the immune, endocrine and nervous systems and could have an important role in the access of lymphocytes and pathogens to the brain. The possible role of such interactions in the pathophysiology of specific neuroinflammatory conditions is also discussed.

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