Characterization of Isolated Human Skin Mast Cells: The Effect of Human Anaphylatoxin and Neutrophils on Histamine Release from Human Skin Mast Cells

Y.		Kubota ^a
S.		Shimada ^a
T.J.		Lawley ^b

^aDepartment of Dermatology, Yamanashi Medical College, Yamanashi, Japan, and

^bNational Institute of the Health, Bethesda, Md., USA

Key Words

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Yasuo Kubota, MD, Department of Dermatology, Yamanashi Medical College, Tamaho-machi 1110, Nakakoma 409-38, Yamanashi (Japan)

Almost all functional studies of mast cell have utilized either rat or human basophils or human lung mast cells as substrate. Little is known about the role of human skin mast cells in cutaneous inflammation, because they are difficult to isolate.

In this study, we have attempted to isolate and purify cutaneous mast cell from human foreskins and characterize them. Following enzymatic digestion of skin and discontinuous percol density gradient, approximately 2×10^6 mast cells were recovered per gram wet weight tissue. Mast cell viability was 90–95%, and histamine content was 2.0 ± 0.35 pg/cell. Cutaneous mast cells were characterized by phase contrast microscopy, toluidine blue staining, FITC-avidin and electron microscopy, which showed normal mast cell morphology. Stimulation of mast cell suspensions with calcium ionophore A23187, human C3a or C5a induced significant histamine release (up to 25%). C5a is more potent than C3a in this regard. C5a-induced histamine release was not so rapid, being continued at 60 min in a time-dependent manner. Temperature-dependent experiments showed no release at 0°C

and maximal release at 22°C. Furthermore

recent studies have shown that supernatants from human neutrophils (PMN) contain a factor which is capable of causing histamine-releasing activity (HRA-N). We then examined the effect of HRA-N on freshly isolated human skin mast cells. Histamine release was induced in a dose- and time-dependent fashion by the PMN supernatant over the range from 5 to 29%. Thus the enzymatic digestion method is useful for getting large amounts of human skin mast cells. These findings indicate that human skin mast cells may be responsible for the inflammatory reaction in skin.