Effect of **Beta-Carotene** on Histamine Release from Human Mast Cells and Monocytes

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Key Words

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Free radicals have been shown to originate from monocytes and to activate mast cells, which might be an important process in inflammatory reactions [1]. Some radical scavengers, e.g. certain dihydroquinolines or – less efficiently – superoxide dismutase, as well as the synthetic retinoids isotretinoin and etretinate, have been shown to inhibit histamine release from human adenoidal mast cells [2]. In view of the recent interest in nonprovitamin, especially the antioxidative properties of carotenoids [3], we studied the effects of β -carotene on histamine release from human adenoidal and skin mast cells, as well as from human peripheral monocytes, which have recently been shown to serve as important sources of histamine in blood [4].

β -Carotene is rather unstable, must be protected from light, stored in airtight containers and can be made water-soluble for application in cellular systems only with the help of a suitable solubilizer such as certain polyoxyl compounds, e.g. solutol HS 15 [5]. Therefore, it was essential to test both the solubilized β -carotene and the solubilizer, which were gifts from the manufacturer (BASF, Ludwigshafen, Germany). All concentrations were related to the final concentration of β -carotene in the cell samples.

Human adenoidal mast cells were obtained and isolated mechanically [6]; skin mast cells were obtained enzymatically using collagenase [7] and human peripheral monocytes as previously described [8].

Mast cells (approximately 1×10^7 /sample) were preincubated with solutol HS 15 without or with added β -carotene for 5 min in Hanks' buffer, and the monocytes (approximately 3×10^6 /sample) for 60 min, in Iscoves' medium.

Table 1 shows that 10^{-4} M the solubilizer solutol HS 15 inhibited the histamine release from all three cell types investigated, whereas it increased it at 10^{-3} M β -Carotene, however, caused a rather graded dose-dependent inhibition of histamine release over the range of 10^{-6} to 10^{-4} M and reduced the solutol-induced release at 10^{-3} M in mast cells, with only little effect in

monocytes. The results demonstrate a synergistic effect of β -carotene and its solubilizer solutol HS 15 in human adenoidal and skin mast cells and suggest the use of this particular combination as an antiallergic or anti-inflammatory drug.

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Table 1. Influence of β -carotene and solutol HS 15 on net histamine release (percent of total) from human mast cells and monocytes

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