G. Blood, Bone Marrow, Spleen and Reticuloendotherial System

Evidence for an Extravascular Catabolic Pathway of Human IgG

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IgE binds to basophyllic leukocytes and mast cells and upon addition of antigen or anti-IgE results in the release of histamine or slow-reacting substance of anaphylaxis, which mediate immediate type of allergic reaction. IgE is catabolized at a greater rate than any of the immunoglobulins. To answer the question of whether IgE has an additional catabolic pathway, namely extravascular catabolism, metabolic studies of radioiodinated IgE along with the other four major immunoglobulin classes were performed in 26 patients with non-allergic diseases and two normal volunteers.

The data of IgE metabolism were analyzed first using computerfitting to compartmental models with and without an extravascular catabolic pathway. The IgE data was fit successfully to the former model. The data of IgE and other immunoglobulins were then analyzed with the method of Nosslin, which provides an intercept value from plots of caluculated values derived from the radioactivities in the serum and urine at different time points. If the intercept value is equal to one, there is no extravascular catabolic pathway, whereas if it is less than one, there is extravascular catabolism. The mean$\pm$SD of the intercept values of IgE was 0.68 ± 0.15, which was significantly less than one ($P<0.001$). The mean values of IgD was 0.80 ± 0.11, which was also significantly less than one ($P<0.01$). That of IgG was 0.92 ± 0.05 ($P<0.02$). In contrast, the mean intercept values of IgA and IgM were 1.14 ± 0.12 and 1.20 ± 0.31 respectively, which were not significantly different from one ($P>0.02$).

These results indicate that there is definite extravascular catabolism of IgE and possibly IgD. It is reasonable that the extravascular catabolic pathway of IgE is related to the unique biological as well as metabolic behaviors of IgE.

Localization of the Active Marrow Determined by Superimposing the Marrow Scintiphoto Image on the Bone X-Ray Picture in Refference to the Pattern of Periphery Extension

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Since the bone marrow image often exhibits a complex and ambiguous figure, the localization of the active marrow was exactly determined by superimposing the marrow scintiphoto image over the bone X-ray photofilm. The active marrow was delineated in the life-sized scintiphotograms using ^{99m}Tc sulfur colloid.

In those cases which displayed a pattern of periphery extension in the marrow distribution, difference was noticed in the radiocolloid distribution in the long bone between the epiphysis and metaphysis bounded by an epiphyseal fusion line.

In the infantile cases of hereditary spherocytosis, the active marrow was distinctly observed in the epiphyseal nuclei. When the cases were adult and/or developed mild hemolysis, the active marrow appeared to have diminished selectively in the epiphyseal part of both proximal and distal ends of the humerus and femur and that of proximal end of the tibia and fibula. The process was