

RESISTANCE OF BETA LACTOGLOBULIN TO PEPSIN AND HYPERSENSITIVITY COW'S MILK IN INFANTS

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Cow's milk is widely used as a rich source of proteins, calcium and phosphorus needed for the development of teeth and bones of infants and children. However some infants cannot consume cow's milk since they develop hypersensitivity reactions to milk proteins. Mostly they develop IgE mediated hypersensitivity reactions to the major whey protein betalactoglobulin. Incomplete digestion of betalactoglobulin in high pH that prevails in the stomach of the infants compared with that of the adults (pH 2) is expected to play a significant role in development of cow's milk allergy in infants.

Experiments were conducted to determine the degree of *in vitro* pepsin hydrolysis of betalactoglobulin in the high pH values that prevail in the infants' stomach followed by pancreatic proteinases and to characterize the resulting hydrolysates physico-chemically and immunologically.

Betalactoglobulin from cow's milk was hydrolyzed with pepsin at pH values 2-5 followed by pancreatic proteinases at pH 7.5. The resulting hydrolysates were analyzed for the degree of hydrolysis by determining the concentration of Trichloro acetic acid (TCA) soluble products, Bicinchoninic Acid Assay (BCA) and Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis (SDS-PAGE) and immunologically by competitive Enzyme Linked Immunosorbent Assay (ELISA) using human IgE.

The results showed an increase in the resistance of betalactoglobulin to pepsin digestion with the increase of pH of the medium. Further, the reduced degree of hydrolysis at pH 4 and 5 resulted in prolongation of the time taken for hydrolysis of it by pancreatic proteinases and enhanced residual antigenicity with human IgE. These findings strongly suggest that antigenic epitopes of betalactoglobulin are degraded by pancreatic proteinases at a slow rate when pepsin digestion occurs under the conditions that prevail in the stomach of the infants. This could be of much importance in development of IgE mediated hypersensitivity reactions to cow's milk in infants.