

IMMUNOLOGICAL ABERRATIONS IN VITAMIN A DEFICIENT RATS

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## SUMMARY

The effects of vitamin A deficiency on immune mechanisms were investigated in vitamin A deficient rats employing a rearing system which allows rapid and synchronous induction of vitamin A deficiency. This rearing system enables the force-feeding of animals to equalize food intake, thus, preventing inanition which accompanied the conventional rearing method. The main emphasis was on the mechanism by which vitamin A deficiency depressed the local immune response of these animals. Immunofluorescent studies using antiserum specific for SC or  $\alpha$ -chain, demonstrated that while the staining patterns with these sera were unchanged, the intensity of staining by anti-SC was markedly depressed from day 6 of retinoic acid withdrawal onward. This finding suggested that the synthesis of SC by epithelial cells might be defective in vitamin A deficient animals. Such a notion was further supported by a subsequent experiment designed to study de novo synthesis of sIgA by these animals. Using radioactive amino acid precursors injected into in situ intestinal loop, it was found that the incorporation of radioactivity into sIgA was reduced following retinoic acid withdrawal. This suggests that the synthesis of newly synthesized sIgA and its being secreted into intestinal fluid was depressed by vitamin A deficiency.

The functional integrity of systemic immune response was determined by enumeration of plaque forming cells and titre of hemagglutinin antibody in the serum following immunization with heterologous erythrocytes. The number of plaque forming cells in A<sup>-</sup> rats was not only significantly lower than that of A<sup>+</sup> controls but also the plaque size was reduced. This implies that the quantity of antibody produced by any single antibody-producing cell was reduced. On the other hand the kinetics of response between the two groups, judging from both the number of plaque forming cells and antibody titre in the serum, was similar.

The effect of vitamin A deficiency on in vivo microbial clearance and in vitro phagocytic activity were also studied. The results obtained showed that both the microbial clearance and phagocytic activity of A<sup>-</sup> animals were significantly depressed compared to those of A<sup>+</sup> controls. These defects became progressively worse as the severity of deficiency increased.

These data suggest that vitamin A deficiency exerts adverse effects on several aspects of defense mechanisms including the local and systemic humoral immune response and the nonspecific microbial clearance and phagocytic activity.