EFFECT OF THYMUS EXTRACT AND OF LATE THYMECTOMY ON INTERFERON PRODUCTION

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Mice aged 10 days do not produce interferon in response to injection of Newcastle disease virus (NDV). A single injection of a fraction of calf thymus extract, obtained by the method of Gyulling et al., into newborn mice conferred the ability to produce interferon on mice at the age of 10 days. In response to injection of NDV, adult rats produce interferon in high titers. The intensity of interferon synthesis was unchanged 2-3 months after thymectomy.

KEY WORDS: *thymus extract*; *interferon production*.

The secretion of humoral factors by the thymus inducing immunocompetence is now a firmly established fact. These substances contained in thymus extracts are responsible for the high biological activity of the latter in relation to cellular and humoral immunity [7].

In the investigation described below the role of the humoral factors of the thymus in interferon production was studied, having regard to the absence of any such data in the literature.

EXPERIMENTAL METHOD

Fraction I of calf thymus extract, obtained by the writers previously, was used in the experiments; this extract (ASF) stimulates antibody synthesis [1] and its active principle has been found exclusively in thymus extract [2]. Experiments were carried out on noninbred mice and rats. Thymectomy was performed on 3-month-old rats by the method described in [5]. The number of antibody-forming cells (AFC) was determined by the method of Jerne and Nordin [6]. Interferon formation was induced with Newcastle disease virus (NDV, titer 10^{-8}-10^{-9} TCD_{50} in 0.1 ml), obtained from the N. F. Gameleya Institute of Epidemiology and Microbiology. The interferon content in the animals' blood stream was determined by titration in a homologous primary culture of embryonic fibroblasts against 100 TCD_{50} of vesicular stomatitis virus. The results were subjected to statistical analysis [3].

EXPERIMENTAL RESULTS

AFC was injected subcutaneously into newborn mice in a dose of 100 μg, and 10 days later the animals were either immunized intraperitoneally with sheep's red cells ($2.5 \cdot 10^8$) or given an injection of 0.25 ml NDV. The number of AFC in the animals' spleen was determined on the fourth day and the interferon titer on the second day after the beginning of induction. Control animals received an injection of 0.15 M NaCl.

Injection of 100 μg ASF led to a threefold increase in the number of AFC (1.9 ± 0.5 in the control, 5.6 ± 1.4 AFC per 10^6 nucleated spleen cells in the experimental series). Interferon could not be detected in the pooled sera of 18 control mice, whereas in the pooled sera from 19 mice receiving ASF neonatally its titer was 1:16.

A single injection of ASF into newborn mice thus not only induces increased antibody production, but also confers on animals in the early stages of postnatal development the ability to synthesize interferon.

To study the role of thymus hormones in interferon synthesis in the adult organism, interferon production was studied in the early stages after late thymectomy in rats, for it

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has been shown that during this period thymus hormones can no longer be detected in the circulation [4]. Rats were thymectomized at the age of 3 months. Two months later the animals were given an intraperitoneal injection of 0.5 ml NDV, and their serum interferon titer was determined after 24 h. Rats undergoing mock operations were used in the control.

The interferon titer in the animals of both groups was 1:256.

The results suggest that the constant presence of thymus hormones is not essential for the interferon-forming activity of the lymphocytes in the adult organism. Stimulation of interferon production by ASF in the period of early postnatal development is linked in all probability with the action of humoral factors of the thymus contained in it, which are responsible for the formation of the immunocompetent system and for immunological maturation. Thymus hormones are evidently differential factors, the quantity of which in the early stage of postnatal development, i.e., during the period of formation of the immunocompetent system, does not correspond to the number of cells requiring these substances for their further differentiation toward immunocompetence.

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ALLERGIC REACTIONS OF PULSATING HEART CELLS IN CULTURE

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The method of culturing and the characteristics of growth in culture of pulsating human embryonic heart cells are described. The effect of homologous antiheart antibodies and of a complex of ragweed allergen and antiragweed antibody on the contracting heart cells of chick and duck embryos in culture was investigated. Under the influence of these factors pulsation of the heart cells slowed and weakened and they developed vacuoles.

KEY WORDS: *culture of heart cells*; *pulsation*; *antiheart antibodies*; *antiragweed antibodies*.

The study of allergic reaction of the heart in the intact organism is difficult because of complex neurohumoral influences for which it is sometimes difficult to make allowance. The use of cultures of heart cells enables these side effects to be eliminated and the direct action of the immunological factor on heart cells to be studied.

A characteristic feature of heart cells in culture is that they preserve their contractile power. Because of this feature, not only the morphological changes, but also functional changes in these cells in response to stimulation can be investigated. Cultures of heart cells are thus an interesting model for the study of allergic reactions.

The effect of antibodies and, in particular, of antiheart antibodies on cells in culture has been studied in only a few investigations [4, 9, 11, 12].

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