Preliminary Note

Studies on the serum adenosine deaminase activity test in patients with hepatitis

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Adenosine Deaminase (AD) is a nucleodeaminase which substitutes the amino radical of adenosine for a hydroxide radical to form inosine and ammonia. Straub studied metabolism in mice with Ehrlich's ascites carcinoma and found that AD activity had increased in the mice. After that, it was reported that this activity was high in the case of not only malignant tumor but also inflammatory disease. AD activity was studied especially in hepatic diseases.

In and after 1981, a health control program has been conducted for patients with hepatitis which has been prevalent in Hayakawa Town, Yamanashi Prefecture. Recently, the AD activity test was carried out in these patients to clarify the pathological conditions of the diseases. For it, 70 patients were selected from among those who had received the second examination performed in November, 1983, since they had presented abnormal values in the test of transaminase and γ-GTP and the colloid reaction (ZTT and TTT) in the past 5 years.

The reagents used were those contained in the kit, AD-Test (Maruho Company, Japan). The principle of testing was to estimate the amount of ammonia released by the action of AD by direct colorimetric measurement which was performed by the indophenol reaction. In testing, 50 μl of serum and 0.2 ml of buffer solution were placed into a test tube and incubated at 37°C for 30 minutes. Immediately after incubation 1.5ml of coloring reagent A was added. Then 2.0 ml of the coloring reagent was added to the tube. After through stirring, the tube was incubated at 37°C for 20 minutes to allow the coloring reaction to take place. After this reaction the tube was allowed to stand at room temperature until it was cooled down. The extinction was examined at a wavelength of 630 nm. The controls set up for each sample consisted of a blind-test control (a sample subjected to no incubation for the stimulation of the enzymatic reaction), a control containing the standard solution, instead of serum, and a blind-test control for reagent used for the estimation. The extinction was examined in each control by the procedure prescribed. AD activity value was calculated from the extinction by using a formula. It was within a normal range of 5.2 to 18.6 IU/L.

Studies were made on the relationship between AD and transaminase activity (Fig. 1, Present address : Research Institute of Gerontology, Nippon Medical School, 1-10-19, Ueno-Sakuragi, Taito-ku, Tokyo, 110 Japan
2). There was a significant correlation between AD and GOT activity, since the correlation coefficient was 0.3523 \((p<0.05)\) between the two. There was no correlation between AD and GPT activity values, since the correlation coefficient was 0.1741 between the two.

Studies were also made on the relationship between the value of the colloid reaction and that of AD activity. There was a significant correlation between the TTT value and AD activity value, since the correlation coefficient was 0.4737 \((p<0.05)\) between the two.

\[ r = 0.3523 \quad (p<0.05) \]

- : Abnormal value of transaminase in the past 5 years, ● : Others

**Fig. 1** Correlation between GOT and AD activity in patients with hepatitis
A significant correlation was also noticed between the ZTT value and AD activity value, as the correlation coefficient was 0.5883 (p<0.05) between the two.

There were correlations among GOT, colloid reaction, and AD activity. Then an attempt was made to use AD activity as an indicator for chronic hepatic disorders. In it, AD activity was examined in persons with any functional disorder of the liver who has shown an abnormal value of transaminase in the past 5 years. The results obtained are illustrated in **Fig. 1, 2**. Persons who had shown an abnormal GOT or GPT activity value for a long time presented an abnormal AD activity value, without exception. In the present investigation AD activity value was abnormal in some of the persons who showed a GOT or GPT activity value which was within a normal range. Such persons numbered nine of the 37 persons (24.3%) showing a normal GOT activity value and seventeen of the 47 persons (36.1%) showing a normal GPT activity value.

In those persons with any functional disorder of the liver there were significant corre-
lations between AD and GOT activity and the results of the colloid reaction test. AD activity value was abnormal in persons who had been suffering from such functional disorder of the liver for a long time. Moreover, of persons in whom actual transaminase activity value was within a normal range, some exhibited a high level of AD activity value. From the results mentioned above, it was concluded that AD activity could be used as an indicator for any chronic functional disorder of the liver.

References


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