USE OF DNA IN MYLERAN-INDUCED CYTOPENIA

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Myleran was given by mouth in a single dose of 10 mg/kg or in doses totaling 25 mg/kg spread over 18 days to Wistar rats weighing 180-190 g. After receiving myleran, the animals were given four to five injections of homologous DNA on alternate days in a dose of 2 mg per rat or, alternatively, standard salt citrate. Under the influence of DNA the duration of leukopenia was reduced. The number of leukocytes in animals receiving the smaller dose of myleran returned to its initial level by the sixth day in the treated animals and by the 25th day in the untreated animals; after the larger dose of myleran the initial level was restored by the 15th and 25th days after the beginning of DNA injection, respectively. Differences in the number of leukocytes in the treated and untreated animals receiving the smaller and the larger doses of myleran were due mainly to the dynamics of the neutrophils, the numbers of which were greater in the treated than in the untreated rats by 54-110% in the first experiment in the period from 6 to 15 days, and by 23-38% in the second experiment in the period from 10 to 23 days after the beginning of DNA administration.

KEY WORDS: myleran; leukopenia; DNA administration.

DNA is known to stimulate hematopoiesis in healthy and irradiated animals [1-4, 9] and also to prevent the development of leukopenia in patients receiving radiotherapy or chemotherapy [12]. It was accordingly decided to study the effect of DNA on cytopenia induced by cytostatics.

EXPERIMENTAL METHOD

Experiments were carried out on 67 male Wistar rats weighing 180-190 g. Myleran was given by mouth to the animals: a single dose of 10 mg/kg in the first experiment, an 18-day course, with an initial dose of 10 mg/kg followed by doses of 5 mg/kg at 5-day intervals up to a total dose of 25 mg/kg in the second experiment. The animals of the experimental groups received intramuscular injections of 2 mg DNA 24 h after the end of myleran administration, whereas the animals of the control groups received standard salt citrate (SSC) on alternate days for 4 and 5 times, respectively, in the first and second experiments.

Preparations of DNA (molecular weight 29·10^6 daltons; protein 0.5%, RNA 1.5%) were obtained from rat thymus and spleen by a modified method [10]. The peripheral blood of all the animals was investigated. The experimental results were subjected to statistical analysis by Student's method.

EXPERIMENTAL RESULTS

After a single injection of myleran in a dose of 10 mg/kg followed by four injections of SSC during a period of 2.5 weeks the rats developed leukopenia and a temporary decrease in the platelet count, but no change in the number of erythrocytes (Fig. 1). The greatest decrease in the leukocyte count of the animals of the control group was observed on the fourth day, down to 58% of normal (7700), after which their number slowly increased to 75% of normal by the 20th day. The leukocyte count of the animals receiving DNA fell by the 4th day to 77% of normal (9600), but after the sixth day it was back to its original values and was...
Fig. 1. Dynamics of blood cells in rats after a single dose of 10 mg/kg myleran and four injections each of 2 mg DNA (1) or of SSC (2): a) leukocytes; b) neutrophils; c) stab neutrophils; d) lymphocytes; e) erythrocytes; f) platelets. Abscissa, days after beginning of myleran administration; ordinate, number of blood cells (in % of initial value). Large dots denote values significantly (P < 0.05) different from the control.

Fig. 2. Dynamics of blood cells in rats after course of administration of 25 mg/kg myleran and five injections each of 2 mg DNA (1) or of SSC (2). Legend as in Fig. 1.