THE CONCENTRATION OF CERTAIN MICROELEMENTS
IN THE BLOOD AND ORGANS OF RABBITS WITH
EXPERIMENTAL CIRRHOSIS OF THE LIVER

F. P. Ol'gina

From the Department of Hospital Therapy (Head - Professor Ya. V. Borin)
and the Department of Biochemistry (Head - Docent G. A. Babenko),
Ivano-Frankovsk Medical Institute
(Presented by Active Member of the Academy of Medical Sciences, USSR
N. V. Konovalov)
Translated from Byullenten' Éksperimental'noi Biologii i Meditsiny, Vol. 57, No. 3,
pp. 62-67, March, 1964
Original article submitted December 15, 1962

As we know, the liver participates in all forms of the metabolism, and in addition, is the chief physiological
depot for the microelements [2, 3].

We set out to reproduce cirrhosis of the liver in animals experimentally, and, with its progressive develop-
ment, to study the concentration of certain microelements dynamically in the blood, and when the animals died,
their concentration in the organs as well.

Such works are absent from the literature.

EXPERIMENTAL METHODS

Injury of the liver tissue in rabbits was caused by the injection of carbon tetrachloride, using the dosages pro-
posed by L. S. Rubetskoi and R. N. Korotkina [4], but with some changes in the injection intervals. The rabbits were
injected with the carbon tetrachloride twice a week, subcutaneously, using 0.2 ml of a 40% solution in apricot oil
per kg of weight of the animals. The first course consisted of 14 injections, the second of 12, and all the following
of 10; an interval of 1 month was allowed to elapse between courses. Throughout the entire period of the exper-
iment, at certain time intervals (25, 45 days, 2, 2½, 3, 4, 5, 6, 7, 8, 9, 10, 11½, 12, 13 months, after initiation of
the injections), we investigated the concentration of the microelements, copper, zinc, cobalt, and iron, as well as
sugar, in the blood.

After the death of the animals, we investigated the concentration of the microelements in the liver, muscles,
femur, brain, and spleen. In addition, we made a macroscopic study of the morphological changes in the liver, and
also determined the changes in its structure visible in serial sections stained with hematoxylineosin. A total of 22
rabbits was used in the experiments, of which cirrhosis was induced in 10; in 7 control rabbits, we investigated the
microelements in the blood without injection of the carbon tetrachloride, and in 5 control animals we determined
the microelements in the organs. Male rabbits (weighing from 1.9 to 3 kg) were maintained on their normal diet,
under the vivarium conditions.

The amount of microelements was demonstrated by the colorimetric technique, following the method of
Babenko [1], making it possible to use a single sample for determining the following microelements: copper, zinc,
cobalt, as well as iron. We performed a total of 693 determinations of the microelements in the blood and organs,
and 118 determinations of the blood sugar concentration (the data in the tables and figures represents material
gathered over 6 months, since after this period of time, due to the death of the animals, the number of observations
was insufficient for calculating mean indices).

The results of the investigations were subjected to statistical analysis, with calculation of the mean error (±m).
Fig. 1. a) Intense development of the interlobular connective tissue. Ocul. 10 x, obj. 8 x; b) false lobule, bounded by a layer of connective tissue. Ocul. 10 x, obj. 40 x; c) thickening of the fibrotic capsule due to connective tissue proliferation with scar tissue extension. Ocul. 10 x, obj. 40 x. Stained with hematoxylin-eosin.