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COPPER CONTENT OF BLOOD PLASMA

EX AEDIBVS ACADEMICIS IN CIVITATE VATICANA



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COPPER CONTENT OF BLOOD PLASMA

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SUMMARIVM — Cupri quantitas in sanguinis plasmate constans est; auge-
tur autem, si certi morbi adsint, ut morbi contagiosi vel cancer.

Ferri autem quantitas in sanguinis plasmate, praeter quam ex morbis,
ex aliis quoque causis permultis mutatur.

One of Europe's most eminent clinicians investigated a patient in 1962. He determined the copper content of his blood plasma, which he found to amount to 106 μg in 100 ml plasma only. He concluded that the patient could not have an infectious disease or cancer, because its blood plasma should then contain much more copper. In 1964 the patient was again investigated. His plasma copper amounted now to 186 μg in 100 ml plasma and he had cancer.

Almost all of the copper present in the blood plasma is incorporated into the compound coeruloplasmin. The healthy and the pathological blood releases this compound at about the same rate, but in the pathological organism more coeruloplasmin is formed and released into the circulation. This

explains the higher copper content of the latter in the plasma of a pathological organism.

Extremely low iron content of the blood may indicate a pathological state as well, but the iron content of the blood plasma is interfered with many more factors than its copper content. The copper content of the blood plasma is almost the same day and night, while the iron content is not. In the healthy subject the morning plasma iron concentration can be about twice of that measured in the evening. My colleague LOCKNER determined not only the plasma iron concentration but also the transport rate of plasma iron to the bone marrow making use of ^{59}Fe as an indicator. In contrast to the iron concentration the iron transport rate was found almost identical in the evening and in the morning. Is the plasma iron concentration low, it is transported to the bone marrow at an increased rate and vice versa.

The plasma iron is also influenced by other factors, which plasma copper is not, and therefore the plasma copper concentration is a more convenient indicator of a pathological state than is the determination of its plasma iron concentration. That in infectious diseases and in cancer, the plasma copper concentration is increased, was already observed by HEILMEYER many years ago.