Chondrosamine as a Component of Gangliosides and of Submaxillary Mucin

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According to Klenk [1] the gangliosides are composed of fatty acid, sphingosine, hexoses (in the main galactose) and a hydroxyamino acid called neuraminic acid (»Neuraminsäure») with the composition $C^{10}H^{19}NO^9$. In 1938 one of us [2] suggested the presence of hexosamine in the gangliosides and a recent analysis by paper chromatography [3] indicated that the hexosamine present might be chondrosamine.

We have now succeeded in isolating chondrosamine (as hydrochloride) from gangliosides prepared from normal brain tissue. After several recrystallisations it was obtained in a reasonably pure form and identified by qualitative reactions, elementary analysis, optical rotation and X-ray diffraction pattern.

A striking agreement in certain qualitative reactions between gangliosides and a carbohydrate occurring in submaxillary mucin [4] was noted in 1938 [2]. This carbohydrate was supposed to be a disaccharidic substance composed of a N-acetylated hexosamine and a polyhydroxy acid with six carbon atoms, the latter not being a hexuronic acid, however. The disaccharide in question (or polymers of it) is the dominating carbohydrate in the submaxillary mucin. From a submaxillary mucin hydrolysate we have now been able to isolate a hexosamine as the hydrochloride, and also in this case it proved to be chondrosamine.

Substances giving the same qualitative reactions as the gangliosides and the submaxillary mucin carbohydrate are also present to some extent in other epithelial mucins and in the glycoproteins of the blood serum. The carbohydrate group responsible for these reactions, which is believed to be composed of N-acetylated chondrosamine and a polyhydroxy acid with six carbon atoms, thus seem to have a rather wide distribution. The neuraminic acid, the isolation procedure of which includes prolonged heating with barium hydroxide, is probably to be regarded as a degradation product of the native disaccharidic compound.

A detailed report will be given elsewhere. The investigations are continued.

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