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A proposal for a terminology of 'sialic acid' derivatives

The compound known variously as sialic acid (Blix *et al.*, 1952), neuraminic acid (Klenk, 1941), lactaminic acid (Kühn & Brossmer, 1956), gynaminic acid (Zilliken *et al.*, 1955) and hemataminic acid (Yamakawa & Suzuki, 1952) is of central importance in biology. It controls biological functions such as cell surface specificity or membrane transport. It is a component of glycoproteins, proteoglycans and glycolipids occurring in cellular organelles, extracellular matrix, body fluids and some micro-organisms (see, e.g., Rosenberg & Schengrund, 1976).

The terms sialic acid and neuraminic acid have been used for some time in parallel, roughly according to the proposal of Blix *et al.* (1957). There is now an urgent need for a systematic and uniform nomenclature for the 'sialic' acids. The structures of a large number of glycoprotein oligosaccharides have recently been determined, and the use of n.m.r. spectroscopy, mass spectrometry and sequential enzymic degradation will ensure even faster progress. We must consider how to avoid in future the confusions in terminology for the same compound, and enzymes working on the same compound (e.g. neuraminidase is an enzyme that hydrolyses sialic acid glycosides). It is equally important to provide a systematic nomenclature for the compound, its derivatives and associated enzymes.

It must be recognized that dropping or modifying names proposed by outstanding scientists who independently characterized the compound implies historical injustice, which may generate feelings among their pupils and fellow countrymen that hinder acceptance of a consistent system. We therefore suggest a procedure which retains some of the associations of the current terminology, appropriately modified to permit the application of the general rules of carbohydrate and enzyme nomenclature. We intend thereby to produce a terminology which feels familiar, and is usable by the widest possible range of scientists, both biologists and chemists.

We propose that the reference sugar should be a nonulose of the structure shown (1):

and that it should be called by the trivial name of sialose, standard abbreviation Sia. It may be assumed to be in the pyranose form (2) unless otherwise specified. Derivatives would be sialosamine, i.e. 5-amino-5-deoxysialose (SiaN), *N*-acetylsialosamine (SiaNAc), etc. Aminosialosonic acid (SiaNA) would replace neuraminic acid, and acetamidodialosonic acid or acetylaminodialosonic acid (SiaNAcA) would replace sialic acid or *N*-acetylneuraminic acid. The generic name for enzymes which cleave the glycosidic bond of sialosides would be sialosidases, and aminosialosonidase would correspond to neuraminidase, etc. It will be clear that much more information can be conveyed by the proposal than is currently possible. Our preference for 'sial-' as the root of the system is based entirely on the practical considerations that the outcome should be economical, euphonious and unambiguous. The roots based on the four alternative names listed above proved less satisfactory. No considerations of the respective merits or priorities of the outstanding scientists who initiated the study of sialic acids were involved, nor could they have been fruitful.

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