

Editorial Note on Journey of Hyaluronan Research

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Editorial Note

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EDITORIAL NOTE

The structure of hyaluronan is basic. It is a linear glycosaminoglycan consisting of GlcNAc and d-glucuronic acid disaccharide units with alternating glycosidic bonds of β -1,4 and β -1,3 that can be repeated 20,000 times or more, with a molecular mass of >8 million Da and a length of >20 μ m. Its biology, on the other hand, is incredibly complicated. It is an important, omnipresent component of extracellular matrices that are involved. In 1934, Karl Meyer and John Palmer published a JBC classic entitled "The Vitreous Humor Polysaccharide" which described a large glycosaminoglycan containing hexuronic acid, amino sugar, and no sulfoesters. Hyaluronic acid from hyaloid (Greek for vitreous) and uronic acid, the macromolecule now known as hyaluronic acid (HA)², is suggested. Over the next 20 years, Karl Meyer's ongoing research on hyaluronan established its disaccharide structure ((GlcUA β (1-3)-(GlcNAc β (1-4)-) in an article titled "The umbilical cord structure of hyalobiuronic acid. His research journey is outlined in the Minireview Prologue published in JBC in 2002 for the Hyaluronan Minireview Series . Karl Meyer is regarded as the "Father of Glycosaminoglycan Science" because of his discovery and recognition of its structure, as well as his research with other glycosaminoglycans. My thesis was published in the JBC in 1969 at the Rockefeller Institute (now Rockefeller University) with Stanley Sajdera, another graduate student. As Herb Tabor was at that time on the Journal's Editorial Board, he was possibly a reviewer.

This study showed that cartilage-isolated proteoglycans (now called aggrecans) were reformed in dissociative guanidine hydrochloride solutions. This study began my extensive research career with hyaluronan, which was the missing thread needed to form proteoglycan aggregates, although I did not know it, and was not known to be present in cartilage at that time. In 1972, Tim Hardingham and Helen Muir demonstrated that cartilage proteoglycan monomers interacted with hyaluronan and that hyaluronan was present in proteoglycan monomers. During this time, Koji Kimata's lab discovered an 85-kDa protein in the cell matrix synthesised by mouse dermal fibroblast cultures that was strongly attached to hyaluronan. It was isolated from distilled hyaluronan isolated from cultures using hyaluronan lyase digestion. They then showed that the fibroblasts did not synthesise this protein, but derived it from the foetal bovine serum (FBS). This group's subsequent studies established SHAP as I alpill heavy chain 1 (HC1) and HC2 covalently.