



## Detection and partial characterization of dissolved glycoproteins in oceanic waters

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**ABSTRACT:** The widespread occurrence of dissolved proteins as well as porin proteins was confirmed in water columns at five stations located in the North Pacific, the northern North Pacific, and the Bering Sea, where no investigation has heretofore been made with regard to dissolved protein. The major dissolved proteins detected in this study were determined to be glycosylated, based on the detection of an aldehyde group formed by the periodate oxidation of the electrophoretically separated dissolved proteins. The cross reactivity against lectins to the glycoproteins indicated that there were two types of linkage between sugar chain and polypeptide; one was an N-linked sugar chain and the other was an O-linked sugar chain. In this study, a previously reported dissolved protein with an apparent molecular weight of 40 kilodaltons was identified as an OmpA-like protein, not a porin protein but a major outer membrane protein of most pathogenic gram-negative bacteria. The survival of porin proteins in dissolved organic matter is thought to give rise to the resistant structure of these proteins; consequently, unidentified dissolved proteins could also be porin proteins. However, the occurrences of glycoproteins and an OmpA-like protein demonstrated that proteins other than porin proteins account for the majority of dissolved proteins, since no glycosylated porin protein is known. There must therefore be an additional mechanism by which dissolved proteins are protected from biological attack. The possibility that glycoprotein sugar chains can help preserve other dissolved proteins in seawater, as well as the glycoproteins themselves, is discussed herein.

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