Antarctic bacteria: a new source of polyunsaturated fatty acids for humans?

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The production of omega-3 polyunsaturated fatty acids (PUFA) by bacteria has been firmly established for over two decades although it is still commonly ignored within the fields of marine ecology and biogeochemistry. A large proportion (up to 30%) of PUFA producing bacteria have been isolated from permanently cold environments such as the deep-sea and Antarctic sea ice (1,2). Investigations of sea ice microbial communities (SIMCOs) from Antarctica have revealed a high diversity of bacterial taxa with the ability to produce PUFA. These include members of the γ-Proteobacteria and the *Cytophaga-Flavobacterium-Bacteroides* complex. The majority are psychrophilic (requiring low temperatures for growth) and halophilic (requiring the presence of salts for growth) in contrast to the bacteria present in the underlying water (2,3).

PUFA-producing bacteria have gained recognition as an alternative source for human use. A significant advantage is that bacteria contain only one long-chain PUFA component (usually eicosapentaenoic or docosahexaenoic acids) rather than the multiple components present in fish or algal oils (4). Hence bacteria represent a naturally occurring source of certain PUFA which bypass the expensive purification of individual components.

Studies of PUFA-producing bacteria will be highlighted examining the role of PUFA in bacteria, their use in artificial food chains and the application of genetic technology for the production of functional foods using bacterial PUFA genes.

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