

DR. CARLO MONTEMAGNO

■ CO-FOUNDER AND CTO, DANFOSS AQUAZ



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The severe shortage of freshwater could become one of the greatest humanitarian crises. Tackling this head on is Denmark-based Danfoss AquaZ, which is applying the Nobel Prize-winning discovery of aquaporins – proteins which regulate the passage of water across cell membranes – to the production of mankind’s most basic need.

“Basically you’re incorporating life, physiology, within an inanimate material that is stable and producible,” says Dr Carlo Montemagno, who developed and patented the first aquaporin nano membrane. As chief technical officer and co-founder of Danfoss AquaZ, he is bringing to market the technology that could make desalination plants five to 10 times more energy efficient, finally making it economically viable to transmute seawater into water for consumption and agriculture.

Aquaporins isolate water molecules using electrostatic physical recognition and their intrinsic efficiency means they function at the thermodynamically lowest energy level for water purification. By developing the material for the nano membranes in which aquaporins are embedded, Danfoss AquaZ allows the proteins to retain their essential properties while expanding their environmental tolerance.

“It is different to any other membrane technology,” says Montemagno. “They will operate over much wider temperature regimes, in much harsher environments than would normally be found in native protein.”

Danfoss AquaZ is set to release its preliminary product in 2010, and is also eyeing other areas besides water purification. “It could become extraordinarily big,” he insists. “The basic technology is being used for water; we also have the opportunity of making membranes that are selective for different minerals and elements. It will change the way we engage in delivering technical products, whether it’s high-quality water or industrial process. It can change the quality of the environment of many people’s lives.”