

# Antifreeze fish make sense out of junk DNA

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Scientists at the University of Illinois have discovered an antifreeze-protein gene in cod that has evolved from non-coding or 'junk' DNA. Since the creation of these antifreeze proteins is directly driven by polar glaciation, by studying their evolutionary history the scientists hope to pinpoint the time of onset of freezing conditions in the polar and subpolar seas.

Professor Cheng will present her latest results at the Annual Main Meeting of the Society for Experimental Biology in Canterbury on Tuesday the 4th April.

Fish such as cod that live in subzero polar waters have evolved to avoid freezing to death by using special antifreeze proteins that work by binding to ice crystals to prevent the crystals growing larger and causing problems. Most of these antifreeze proteins evolve by natural selection from existing proteins when the DNA coding for them duplicates itself and changes over time to give new functions. However, Professor Christina Cheng and her group have found the gene for the cod antifreeze protein has come from a non-coding region of their DNA known as "junk DNA".

"This appears to be a new mechanism for the evolution of a gene from non-coding DNA", says Professor Cheng, "3.5 billion years of evolution of life has produced many coding genes and conventional thinking assumes that new genes must come from pre-existing ones because the probability of a random stretch of DNA somehow becoming a functional gene is very low if not nil. This cod antifreeze gene might be an

exception to this because it consists of a short repetitive sequence that only needs to be duplicated four times to give a fully functioning protein".

Source: Society for Experimental Biology

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