

Key found to moonlight romance

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An international team of Australian and Israeli researchers has discovered what could be the aphrodisiac for the biggest moonlight sex event on Earth.

An ancient light-sensitive gene has been isolated by researchers from the ARC Centre of Excellence for Coral Reef Studies (CoECRS) that appears to act as a trigger for the annual mass spawning of corals across a third of a million square kilometres of Australia's Great Barrier Reef, shortly after a full moon.

The genes, known as a cryptochromes, occur in corals, insects, fish and mammals - including humans - and are primitive light-sensing pigment mechanisms which predate the evolution of eyes.

In a new paper published in the international journal *Science* today, the team, headed by Marie Curie Scholar Dr Oren Levy of CoECRS and The University of Queensland, reports its discovery that the Cry2 gene, stimulated by the faint blue light of the full moon, appears to play a central role in triggering the mass coral spawning event, one of nature's wonders.

Professor Ove Hoegh-Guldberg, who leads The University of Queensland laboratory in which the genes were discovered, said: "This is the key to one of the central mysteries of coral reefs."

"We have always wondered how corals without eyes can detect moonlight and get the precise hour of the right couple of days each year

to spawn.”

What allows corals to spawn simultaneously along the immense length of the Great Barrier Reef — and also in other parts of the world — has been a scientific mystery till now, though researchers knew that tide, water temperature and weather conditions played a part, Dr Levy said.

However, the remarkable synchronisation of spawning occurring all along the Reef immediately following a full moon suggested that moonlight was a key factor.

Exposing corals to different colours and intensities of light and sampling live corals on reefs around the time of the full moon, Dr Levy found the Cry2 gene at its most active in Acropora corals during full moon nights.

“We think these genes developed in primitive life forms in the Precambrian, more than 500 million years ago, as a way of sensing light,” he said.

“The fact they are linked with the system that repairs damage from ultraviolet (UV) radiation suggests they may evolved in eyeless creatures which needed to avoid high daytime UV by living deep in the water, but still needed to sense the blue light shed by the moon to synchronise their body clocks and breeding cycles.”

“They are, in a sense, the functional forerunners of eyes,” Professor Hoegh-Guldberg said.

In humans, cryptochromes still operate as part of the circadian system that tunes us to the rhythms of our planet, though their light-sensing function appears lost to us, he went on to explain.

“They play important roles in regulating the body-clocks of many

species, from corals to fruit flies, to zebra fish and mice. The proteins they produce are similar to those in humans and other mammals, though they appear to function more like those in the fruit fly,” says Professor David Miller of CoECSR and JCU.

The coral cryptochrome genes were initially identified by Dr Levy and Dr Bill Leggat working with Professor Hoegh-Guldberg (UQ) on Heron Island.

Professor Miller and Dr David Hayward, of the Australian National University, were able to add information on the coral cryptochromes from a large library of coral genes that they have been compiling (so far they have catalogued about 10,000 out of an estimated 20-25,000 genes in coral). Leading circadian clock biologists from Bar-Ilan and Tel-Aviv Universities in Israel played important roles in interpreting the data.

“Many of these genes developed in deep time, in the earliest phases of organised life on the planet,” Dr Leggat said.

“They were preserved for hundreds of millions of years before being inherited by corals when they developed about 240 million years ago, and are still found today in modern animals and humans. They are an indicator that corals and humans are in fact distant relatives, sharing a common ancestor way back.”

Whether they have anything at all to do with human associations between the full moon and romance is not known, but cryptochromes probably still play a part in our body clock.

Source: UQ

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