

Sea urchins could contain the genetic key to curing some diseases

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(Phys.org) -- The purple sea urchin could help develop cures for diseases such as Alzheimer's and cancer, scientists at the University of St Andrews have discovered.

Creatures, such as the sea urchin and sponge, have been discovered to have a special genetic sequence previously only thought to be used by certain viruses.

Now these sea creatures could inform scientists how to produce a therapeutic response in our own cells.

This latest finding builds on the earlier discovery of a short genetic

sequence (“2A”) caused by viruses which can be used to return cells to a stem-cell like state – allowing them to be manipulated and used for special treatments.

Martin Ryan, Professor of Translational Virology at the University of St Andrews, was the key researcher in that discovery.

He said: “You could put two – or more – different genes into one cell, but each individual gene would be expressed at very different levels.

“This process allows you to ‘daisy-chain’ multiple genes into a single gene, but the different proteins made from each part of the new gene are expressed at the same level and within the same cell - which is a massive step forward.

“This sequence was first discovered in Foot-and-Mouth Disease Virus, but we now know it is found in many other types of virus. This sequence has been used (by other researchers) in human gene therapy clinical trials to treat a number of cancers: metastatic melanoma, for example. It has also been used to produce human pluripotent stem cells – a very important step in regenerative medicine, a treatment in which damaged tissues can be replaced.

“It is now possible to take cells from a patient and drive them back into a stem cell state. These patient-specific stem cells could be used to treat a very wide range of diseases - Parkinson’s Disease, Alzheimer’s, heart disease among others.”

Prof Ryan added: “Since our initial discovery, over the last four or five years the use of this sequence has gone through the roof. There have been more than 560 academic papers published using this new biotechnology.”

Originally the research team thought the sequence was a trick played on the host cell by viruses. However, its discovery in creatures such as [sea urchins](#) and sponges indicates that it is used by [cells](#) themselves, and in many different types of animal.

Prof Ryan added: “The study of viruses showed us how we could harness this process for biomedicine and biotechnology, and studying these sequences in creatures such as the sea urchin will provide more tools in the fight against [disease](#) and for use in biotechnology.”

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Provided by University of St Andrews

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