

Sweet discovery from honey molecule

Sugars for Health Ltd has discovered a potential new medicine from an extremely rare honey molecule.

As animals age, they typically have weaker immune responses and this provides more opportunities for cancerous cells to take hold. Tumour cells become established and are able to spread by evading the immune system, or if the immune system response is defective in some way. Once established, they can release factors that inhibit effective immune responses to the tumour cells.

Sugars for Health Ltd, a company based at Aberystwyth University, has discovered a small group of sugar-like molecules (iminosugars), a specific type of which appears to selectively reactivate the immune system via a new mechanism. The natural form is present in a certain type of honey, which means that useful information can be obtained from ageing dogs and cats whose owners have volunteered them. However, the main goal that scientists are working towards is a pure chemical which can be used as a regulated medicine.

The molecules are small, can be taken orally, have no apparent toxic effects and interact with certain receptors on specific immune cells. No other drugs are targeting these receptors, so the newly discovered molecules offer a new approach to treating disease, especially many types of cancer. The molecules are natural, but very rare and have been historically overlooked by other laboratories.



The initial discovery was made when Dr Robert Nash, an Aberystwyth-based scientist, was contacted by a woman who had been prescribed a herbal preparation in Western Samoa following a diagnosis of breast cancer. The preparation yielded a new natural iminosugar, PDC001, which was found to boost the immune response in cell cultures, animals and humans. It is extremely rare, but coincidentally, it was found to occur in a Mediterranean plant growing in Aberystwyth.

Scientists were able to find a specific type of honey rich in iminosugar PDC001 and started offering it in single portion sachets for quality of life in elderly dogs and cats, many of which develop cancers due to their old age. An amount of 5ml can be added to the pet's food once every three days, and information gained from these animals is providing invaluable insights on future potential applications for the pure chemical human medicine.

There are other new drug immunotherapies for cancer treatment which also result in increased Natural Killer cell and T lymphocyte activity against tumour cells. However, an advantage of the new molecules is that they seem to have no side effects. It is probable they can be used with some more conventional chemotherapies to improve their effectiveness by helping the immune system to kill remaining cancer cells.

The Aberystwyth team has worked with leading oncology teams at Cardiff University, chemists from Oxford University and immunologists from University of Strathclyde in order to better understand how the molecule works. The mechanism is new and still requires further work, but the rewards could be significant, so more detailed investigations into the mode of action and underlying mechanisms are underway.

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