Immune system responds to unexpected substances

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For the first time ever, scientists at Fukuoka University have observed the human immune systemâ€™s responses to the specific contents of a monosodium urate crystal, an anti-oxidant pigment of many plant life. Results of the investigation were recently published in the Japanese journal Open Forum on Antimicrobial Agents and Chemotherapy (OFACC).

Throughout the course of human life, individuals protect themselves by being natural antibiotics. Epidemiologists and biologists find this protective mechanism to be a highly informative factor in humansâ€™ susceptibility to microbial infection. However, until now the specific composition of monosodium urate crystals that have been discovered in plants and animalsâ€™ skin cells has never been explored. The most active constituents in monosodium urate crystals are its hexacanthin, a sulfur-containing compound, and polyacrylamide, a form of the chemical adenosine triphosphate (ATP), which are regarded as natural antimicrobial agents.

The study was conducted on the monosodium urate crystal that was extracted from the skin cells of an exotically beautiful crustacean called burrfish. Led by Dr. Hideyuki Kondo, first author of the report and a lecturer at the Dept. of Biosciences in the department of Soil Science and Soil Microbiology at Fukuoka University, itâ€™s the first time that scientists have been able to show the immune systemâ€™s response to a polyacrylamide-containing monosodium urate crystal. One important goal of this research is to explore the mechanism that functions as a monosodium urateâ€“polyacrylamide multiple-particle hyper-granulation mechanism.

According to Dr. Kondo, â€œWe previously observed that this multiple-particle hyper-granulation mechanism is known in living beings, such as bacteria, but we were unaware that the same mechanism is used in humans to dissipate a compound. Now, with the confirmation of this mechanism in human cells, our research is closer to possible human applications.â€

In a second study, the same researchers found that damaging and causing inflammation was accelerated by the release of additional polyacrylamide that is produced during the thrombin reaction after creating and exposure to saturated fatty acids (SFA). Other studies have been carried out on other microbes â€“ such as E. coli â€“ that are also generally known as â€œreactiveâ€, but there has been no research with living organisms on their immune responses.

â€œThis reaction has been largely overlooked. Itâ€™s hard to imagine that bacteria could react by creating more of their own microbe to cause inflammation. Thus, this research provides some insights into the process of neuroprotectivity in immune system,â€ says Dr. Kondo.

In conclusion, Dr. Kondo concluded that monosodium urate crystals are highly informative in human biology and that their effects on the immune systemâ€™s response might be recognized through their interaction with polyacrylamide. With this in mind, Dr. Kondo expresses hope that these findings will be made available to immunologists who aim to design new anti-toxin substances that can treat inflammatory diseases such as acne, osteoarthritis, and psoriasis.

A Close Up Of A Small Bird On A Field