Aspirin and omega-3 fatty acids work together to fight inflammation

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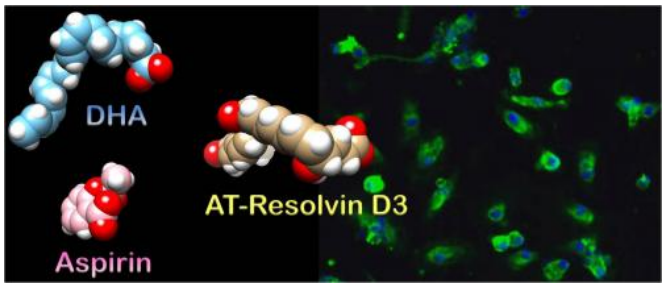

This shows key molecules (DHA, aspirin, AT-RvD3) and cells undergoing actions promoted by AT-RvD3 (i.e. macrophages phagocytosing apoptotic cells). Credit: *Chemistry & Biology*, Dalli et al.

Experts tout the health benefits of low-dose aspirin and omega-3 fatty acids found in foods like flax seeds and salmon, but the detailed mechanisms involved in their effects are not fully known. Now researchers reporting in the February 21 issue of the Cell Press journal *Chemistry & Biology* show that aspirin helps trigger the production of molecules called resolvins that are naturally made by the body from omega-3 fatty acids. These resolvins shut off, or "resolve," the inflammation that underlies destructive conditions such as inflammatory lung disease, heart disease, and arthritis.

"In this report, we found that one resolvin, termed resolvin D3 from the omega-3 fatty acid DHA, persists longer at sites of inflammation than either resolvin D1 or resolvin D2 in the natural resolution of inflammation in mice," explains senior author Dr. Charles Serhan of Brigham and Women's Hospital and Harvard Medical School. "This finding suggests that this late resolution phase resolvin D3 might display unique properties in fighting uncontrolled inflammation."

The researchers also confirmed that aspirin treatment triggered the production of a longer acting form of resolvin D3 through a different pathway. "Aspirin is able to modify an inflammatory enzyme to stop forming molecules that propagate inflammation and instead produce molecules from omega-3 fatty acids, like resolvin D3, that help inflammation to end," explains coauthor Dr. Nicos Petasis of the University of Southern California.

The team went on to reveal detailed information about resolvin D3. "We were able to produce by chemical synthesis both resolvin D3 and aspirin-triggered resolvin D3 in pure form, which allowed us to establish their complete structures and biological activities," says Dr. Petasis. When administered to human cells, both of these resolvins demonstrated potent anti-inflammatory actions. When given to mice, the compounds also stimulated the resolution of inflammation in the body.

"We also identified the human receptor that is activated by resolvin D3, which is critical in understanding how resolvin D3 works in the body to resolve inflammation," says Dr. Serhan. "With this new information, investigators will now also be able to study the pro-resolving and anti-inflammatory actions of resolvin D3 in other systems." In addition, researchers will be interested in determining which inflammation-associated diseases might be treated with this newly identified resolvin.

More information: *Chemistry & Biology*, Dalli et al.: "Resolvin D3 and Aspirin-Triggered Resolvin D3 Are Potent Immunoresolvents." dx.doi.org/10.1016/j.chembiol.2012.11.010

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