

# A solution to reducing inflammation

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Research carried out at The University of Manchester has found further evidence that a simple solution, which is already used in IV drips, is an effective treatment for reducing inflammation.

The researchers also identified that hypertonic solution, which is a solution with an elevated concentration of salt, can ease [inflammation](#) purely through bathing in it – proving the Victorians were right to visit spa towns to "take the waters" for [ailments](#) like rheumatoid arthritis.

The research team, led by Dr Pablo Pelegrin, was investigating how cell swelling can control inflammation; the immune system's first response to injury or infection.

They discovered that [white blood cells](#) swell in a similar way to how tissue swells around a wound. The team then went on to look at what causes the swelling.

The researchers injected solutions with low [ions](#) into mice. They found that these solutions acted as a danger signal, causing cells to swell. The swelling then activates a group of proteins called NLRP3 which then release inflammatory mediators. These activate neighbouring cells to increase inflammation.

However, when a hypertonic solution was administered to the mouse it drew the water out of the cells shrinking them back to their original size. This in turn deactivated the signal for inflammation.

Dr Pelegrin's research provides further evidence for the use of hypertonic fluid therapy for the reduction of inflammation in the brain, a treatment that can reduce the amount of damage caused by illnesses such as stroke and [epilepsy](#). His team has been able to show for the first time why the solution works at a molecular level.

Dr Pelegrin says: "Hypertonic solutions have been used in the treatment of stroke for many years. Clinicians have found that their use not only reduces brain swelling, but also alleviates [brain inflammation](#). However, because there wasn't a molecular target for hypertonic solutions there has been a lot of debate about the clinical effect. Here we have indentified a target for hypertonic solutions by blocking the NLRP3 inflammasome which triggers [inflammatory mediators](#) at a molecular level".

The team also looked at the benefits of hypertonic solutions when used outside of the body. They soaked bandages in the solution before using them on the legs of mice. They also tested bathing the inflamed area in a hypertonic solution and in both cases the inflammation was reduced.

It appears the hypertonic solution produces an osmotic gradient through the skin, which explains why hot springs, which have a hypertonic make up, can ease the pain of conditions such as [rheumatoid arthritis](#).

Vincent Compan worked with Dr Pelegrin on this research in the Faculty of Life Sciences. He says: "This research opens up exciting opportunities for the use of hypertonic solution as a treatment for inflammatory illnesses such as arthritis. What we've identified has the potential to be used to help so many patients."

Another aspect of the team's research identified that the signalling process to activate inflammation is one of the oldest evolutionary processes. The researchers found that the same mechanism of cell swelling causes NLRP3 inflammasome activation in fish as well as

mammals. This means it is one of oldest responses in the body leading to inflammation.

The research has recently been published in the journal *Immunity*.

Provided by University of Manchester

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