

Immune cells, 'macrophages' become activated by body temperature

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Macrophages playing an important role in the immune system eat and fight against pathogens and foreign substances in the very beginning of infection. In this condition, macrophages produce reactive oxygen species for sterilization. However, the relation with the temperature sensor was not previously known.

Professor Makoto TOMINAGA from National Institute for Physiological Sciences (Okazaki Institute for Integrative Bioscience), National Institutes of Natural Sciences, and his research team member Ms. Makiko KASHIO have identified the mechanism through which TRPM2 is activated by body temperature with hydrogen peroxide (a kind of reactive [oxygen species](#)) produced by immune reactions. This research result was reported online in the week by [Proceedings of the National Academy of Sciences](#).

The research group focused on the relation between hydrogen peroxide and TRPM2. Although TRPM2 is usually activated by high temperature near 48°C in the absence of endogenous [ligands](#), it becomes activated at our normal body temperature with hydrogen peroxide production. It means that hydrogen peroxide works as "a switch" which controls TRPM2 function. In addition, they found that phagocytic activity of [macrophages](#) was enhanced in the febrile temperature (38.5 C).

Professor TOMINAGA says, "It was also revealed that oxidation of TRPM2 by hydrogen peroxide is involved in the switch-on mechanism and we identified a single amino acid which is oxidized. This newly

identified mechanism of TRPM2 regulation may lead to the development of new [treatment strategies](#) or drugs for infection. When we are infected with bacteria, we often run a fever, and it is known that body temperature might be important for our immune system. TRPM2 might explain the mechanism through which fever boosts up our immune system."

Provided by National Institute for Physiological Sciences

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