

# Scientists discover clue to ending chronic itching side effect of certain drugs

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(PhysOrg.com) -- Scratching deep beneath the surface, a team of researchers from the University of California, San Diego School of Medicine and three South Korean institutions have identified two distinct neuronal signaling pathways activated by a topical cream used to treat a variety of skin diseases. One pathway produces the therapeutic benefit; the other induces severe itching as a side effect.

The findings, published in this week's early online edition of the *Proceedings of the National Academy of Sciences*, point to the possibility of designing future drugs that effectively treat targeted conditions while blocking the cellular signals that can lead to problematic itching and scratching.

"This new pathway provides another avenue to block the scratching response that appears as a chronic side effect during treatments of cancer, renal failure or the use of some antibiotics," said Melvin I. Simon, PhD, an adjunct professor in the UCSD Department of Pharmacology and a corresponding co-author of the study, headed by Sang-Kyou Han, an adjunct assistant professor at UC San Diego.

Itching – and the scratching response – are part of a complex and imperfectly understood somatosensory process that includes complex, confounding psychological factors. The mechanisms involved are so sophisticated, said Simon, that just reading or thinking about itching can provoke the sensation.

Improving understanding of itch biology isn't just a matter of scratching an intellectual curiosity. It could lead to practical medical benefits, according to Simon. "Itching and scratching are [side effects](#) of a variety of therapeutic drugs and of specific illnesses. In many cases, these effects are severe and make it impossible to use otherwise effective therapies. Thus, the itch remains an unmet medical need."

In the PNAS study, the scientists focused on Imiquimod (marketed as Aldara), a prescription-based topical cream used to treat a number of skin diseases, including some forms of skin cancer, by activating the body's innate immune response. One major side effect: Imiquimod produces intense itching and scratching.

The researchers discovered that the skin sensory circuit activated by Imiquimod to causes itching is different from the [signaling pathway](#) involved in the drug's therapeutic benefit. Indeed, the Imiquimod itch mechanism is distinct from other, well-defined itch mechanisms.

"By breaking down the response and sorting out its various elements, it may be possible to both understand the molecular mechanisms involved and to control them," said Simon, who noted more research is planned.

Provided by University of California - San Diego

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