

The traditional view

For centuries, itch and pain were presumed to be no more than different degrees of sensation — a belief based on assumptions that the central nervous system performs as a single conduit of generalized sensory information. Although this simple view no longer makes sense, making finer distinctions among complex neurochemical functions still pushes the limits of human understanding — and technology.

Pain

Itch/Pain

Itch

SCALE OF SENSATION

What's the difference between

OUCH & ITCH

PAIN SENSATION

- Withdrawal reflex
- Sensed within the body and in the skin
- Pain suppresses itchiness
- Pain-control drugs can have an unfortunate side effect: *itching*

ITCH SENSATION

- Scratch reflex
- Sensation of the skin
- Scratching can cause pain
- Two itch types: histamine-dependent and not
- Pain-control drugs cause itching that cannot be controlled with an antihistamine



The legendary satyr Marsyas suffered a painful fate for having challenged the god Apollo. Although Marsyas is bound to his doom, the universal reaction to pain is to withdraw. This aversion can affect attitudes toward pain research, too. Unlike itching and scratching, which sometimes amuse people, there is often a visceral distaste for pain studies that are intended to help alleviate suffering.



Perhaps the most famous chronic itch plagued Napoleon Bonaparte. The body's response to an itch is to scratch, but scratching itself can cause tissue damage. In some serious cases, itch sufferers have scratched through to the underlying bone.



Fire

Withdrawal

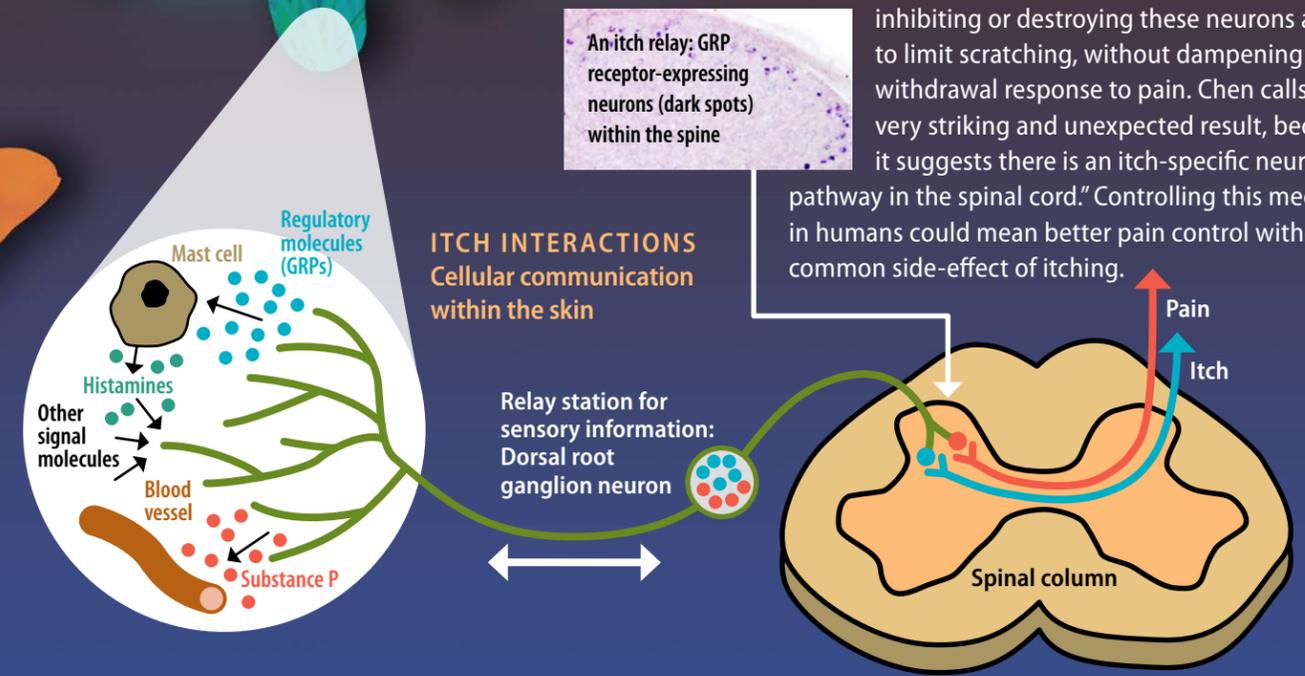


Scratching the itch

Poison ivy



An itch relay: GRP receptor-expressing neurons (dark spots) within the spine



Developing a new view

The complexity of these sensory functions is revealed in the research of Zhou-Feng Chen, PhD, and colleagues. They have identified neurons that express receptors of regulatory molecules called GRPRs. In a mouse model, inhibiting or destroying these neurons appears to limit scratching, without dampening the withdrawal response to pain. Chen calls it "a very striking and unexpected result, because it suggests there is an itch-specific neuronal pathway in the spinal cord." Controlling this mechanism in humans could mean better pain control without the common side-effect of itching.