What is itch, and where does it come from?

Itchiness, also known as pruritus, can range in degree from just a minor annoyance from a mosquito bite to an overwhelming, torturous sensation that can even derange a person completely. Unfortunately, the itch-scratch cycle (the cycle of which an itch demands a scratch and the scratch further deepens an itch) is far from being understood in the aspects of neurophysiology. Until recently, most researchers believed that the itch sensation traveled along the same nerve pathways to the brain as pain. However, this theory did not seem very likely. One team of researchers found that under hypnosis, a fully anesthetized arm could still feel itch under stimulation (3). On top of this, morphine and other opiate-based painkillers actually induce intense itchiness while it blocks pain receptors. Not too long ago, a team of researchers discovered a group of slow-conducting, open-ended, unmyelinated nerve cells that carry the sensation of itch up the spinal cord to the brain, triggering a response.

What causes an itch?

The sensation of itch could be triggered by a number of factors. Chemically, it could be triggered by an allergic stimulus (such as a mosquito bite) which causes cells to release histamine. Histamine is only one type of chemical mediator. Serotonin, a type of neurotransmitter, was found to be another source of itchiness. Another sort of chemical mediator for itch is caused by opioids, natural molecules that are like morphine in the brain. These are just a few ways that an itch could be caused. There are also itches that are caused by various skin diseases such as atopic dermatitis, eczema, and psoriasis (3). Several internal diseases and cancers also can cause pruritus. The most common cause of an itch is dry skin (xerosis).

Why does scratching relieve an itch?

The body's instinctive response to an itch is to scratch. There are various theories explaining why scratching an itch provides relief, but the “itch-scratch cycle” is still a big mystery. Scratching is a reflex that is controlled by the spinal cord in response to an irritating itch without requiring a command from the brain. Researchers have found that experimental animals still have a scratch
reflex though their spinal cords have been severed from their brains (5). One theory says that scratch provides a counter-irritation which is a slight pain that distracts the brain to focus on the discomfort of the scratch instead of the itch (5). Another theory suggests that scratching stimulates large nerve fibers and thus decreases input from small nerve fibers to the central nervous system (4). A different theory says that scratching may relief itchiness by stimulating inhibitory neurons (1). Nevertheless, scratching is just a temporary relief from an itch, and in most cases, scratching just exacerbates the irritation and prolonged scratching worsens the itch in the long run.

What sort of risk factors put patients with cancer more susceptible to pruritus?

Pruritus can occur in patients who have cancer either because of the disease itself or the therapy they receive. One example of disease that may cause pruritus is cutaneous T-cell lymphoma, such as mycosis fungoides or Sézary syndrome. Patients who receive chemotherapy may experience itchiness due to sensitivity which usually subsides 30 to 90 minutes after the therapy without requiring any treatment. Patients who receive radiation therapy may also experience pruritus because the radiation can damage skin cells causing a burning and itching sensation (radiation dermatitis). Patients who receive a bone marrow transplant are also at risk to experience skin conditions that are dry, itchy with rashes (2). Biological response modifiers (such as interferons) also may cause pruritus.

What kinds of drugs are available to treat itchiness?

The initial step is to aggressively emolliate skin to rule out dry skin as a cause. If this fails, then a medication is usually prescribed to help the itching. There are different categories of drugs that will treat different causes of itchiness. Patients could receive a topical medication, such as a corticosteroid, which works to relieve inflammation of the skin. Anti-histamine drugs are commonly used to alleviate itchiness (such as Atarax® or Benedryl®). These drugs counteract the body’s natural reaction to histamine. There are anti-histamine drugs that also work centrally (in the brain) such as Doxepin®. Serotonin-inhibitors, also known as anti-depressants (such as Paxil® or Remeron®) are used to treat pruritis. Buspirone (BuSpar®) is a drug that is usually an anti-anxiety agent, and is used to relieve mild or moderate anxiety and nervous tension. However, this medication is also used to treat pruritus as it blocks dopamine receptors and can solve dopamine-induced itches. For opioid-caused itches, narcotic antagonists (e.g. Naloxone®) are used to treat patients. Neurontin® is an example of another medication that is sometimes prescribed to patients. It was originally used as a treatment for epileptic seizures but was found to also treat pain and itchiness.

What can I do to help relieve itchiness?

- To prevent dryness and irritation of the skin, patients should apply moisturizing creams and lotions on a regular basis.
- Patients should take shorter (no longer than half an hour), tepid baths instead of long, hot ones. Long showers promote dry skin and hot water aggravates more itchiness.
- Patients are also recommended to use soaps that are mild, that contain less soap and detergent which could irritate the skin.
- Using cotton sheets and wearing cotton clothes will help with skin irritations since wool and
some other synthetic fabrics will irritate the skin.
- When itchiness is severe, patients should try putting a cold compress on the affected area. Warm or hot compresses will just irritate the skin further.
- Patients should stay in a cool, humid environment and avoid going into the sun for long periods of time.

References: