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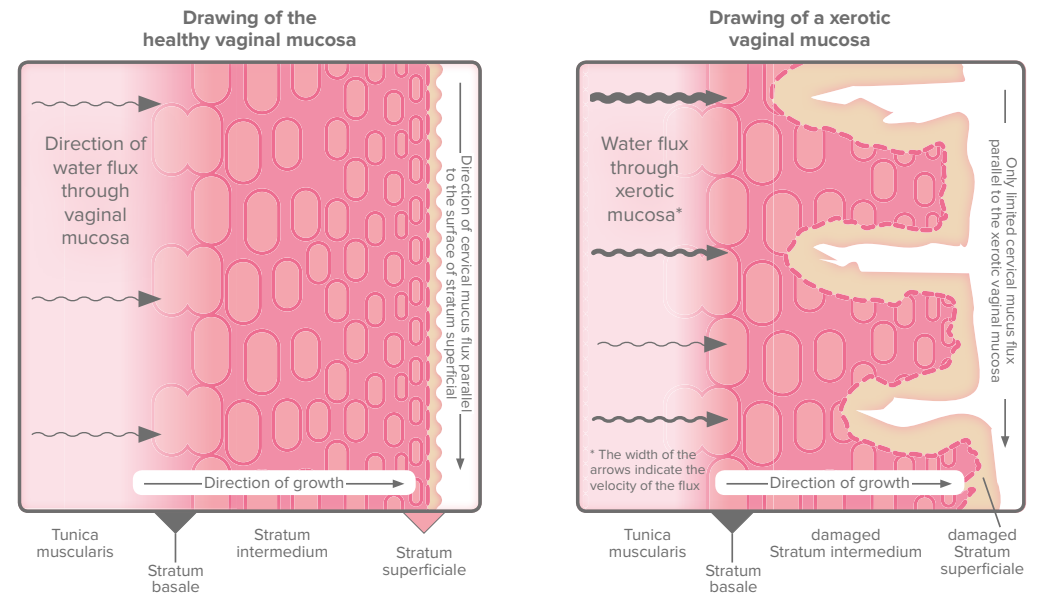
Silicones are an artificially produced chemical compound that does not occur in nature. So why use them in personal lubricants, which are medical products that come into contact with some of the most intimate and sensitive areas of the body? The reason is simple: personal lubricants must possess special properties to deal with the environment inside a vagina.

The lubricant properties necessary for keeping the vaginal mucosa moisturized are described below.

The vaginal mucosa is an organ of the female body that is growing continually and is the only orifice, which is influenced by a woman's hormonal status. Thus, the conditions of the vagina change dramatically with age as well as during the monthly hormonal cycle. The stability of a mature vagina mucosa depends on the monthly hormone cycle. After the end of the hormone cycle discharge from the inside of the body through the vagina is not sufficient any more to stabilize the mucosa.

A cell layer beneath the mucosa creates the vaginal mucosa, just like the body's outer skin. These cells shed, and the shed component is pushed away from the cell layer to the outside of the mucosa. Because of the growing distance between the blood vessels, which supply the living cells with oxygen and nutrients, and the mucosa cell, whenever new cells are generated, the mucosa cells die on their way to the outside of the mucosa. The outer layer of the mucosa is composed of dead cells, held together by lipids, the phospholipids. The phospholipids are an important part of every cell wall. The phospholipids reduce the gas and water permeability of the mucosa. They cannot block permeation totally because there is space between the dead cells, filled with a network of proteins and amino sugars. The mucosa will only be smooth if the dead cells on the outside of the mucosa are consistently removed. When the monthly cycle ends through menopause and the metabolic rate is reduced, and thus the cell division time increases, the vaginal mucosa becomes an unstable system: because the rate of newly produced mucosa cells decreases, the lipid layer, which regulates the water flow through the mucosa, gets thinner and unstable. Basically, the dry vaginal mucosa is a consequence of insufficient natural lubrication. The natural lipids are missing.

To re-establish a situation, most closely resembling the natural one, lipids should be applied. These lipids should replace the natural lipids, which do not form an even layer that blocks gas permeation and water permeation. They are meant to reduce water permeation and oxygen permeation from the outside in. This keeps the balance of the flow and gradients necessary for a healthy mucous membrane.

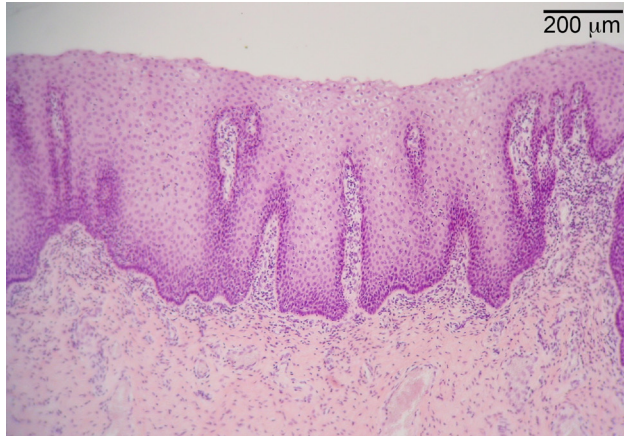


● Description of the juvenile and mature vaginal mucosa

A slight flow of water discharged from the inside of a woman's body, through the vaginal mucous membrane and through the vagina which washes away toxic metabolic products and microorganisms such as the yeast *Candida albicans* and dead mucous membrane cells from the body. When a woman is sexually aroused, this flow increases and becomes noticeable. However, even if the flow is low at other times, the woman's body needs it for well-being and health: the discharge moisturizes the vaginal mucous membrane and decreases friction between the various parts of the vagina, when walking, for example. When the discharge flow stops after menopause or after a cancer treatment, there is an uncomfortable pain.

● Description of the situation after menopause

To keep up the healthy structure of the mucosa, discharge from the inside of the mucosa to the outside is necessary. If the discharge is reduced after menopause, the forces maintaining the structure decrease or even vanish. The mucosa may be looked upon as a barrier. Only if the differential pressure of the water through the barrier, the mucous membrane is great enough, small differences in the structure of the barrier, the mucous membrane, are equalized. The discharge from the inside to the outside of the mucosa are no longer balanced throughout the entire mucosa, but in some small areas the discharge will be smaller and in some greater than the average, due to minor differences in the structure. This will generate tearing and the tearing makes the mucosa permeable. In some small areas below the surface of the mucous membrane, the concentrations of water and oxygen will increase, while in areas directly next to the skin cells, degeneration is accelerated, because the supply of water and oxygen is reduced.



Through the rapid degeneration, tears and channels are opened in the mucous membrane, which can reach to the blood vessels of the skin and to the nerve cells, and trigger irritation of those nerve cells. Naturally, the transport of toxins through skin out of the body is then reduced.

Personal lubricants can minimize the friction and reduce tearing and thus reduce pain.

● The properties of silicone based lubricants

Silicones have some astonishing properties, which make them a perfect raw material for medical substances for treating vaginal illness:

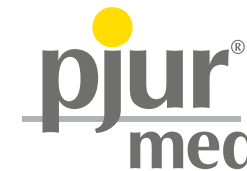
The most important aspect is that cyclopentasiloxane and long chain dimethicones and dimethiconols cannot penetrate mucous membranes. This was proven in animal testing as a confirmation test to prove the results of cytotoxicity testing on behalf of the FDA. The testing was done with pjur med Premium glide as an example of a silicone based lubricant.

The basis for this is that the chain of silicone polymers is less flexible than the chain of saturated hydrocarbons. Both dimethicones and dimethiconol and cyclopentasiloxane are rigid bonds, which can pass through the small openings in the mucous membrane. In addition they are not water soluble, so there is no driving force for penetration.

Silicones can only migrate through the human body by convection. They can be transported by blood circulation, but they cannot migrate without a transport medium. In addition, the diameter of the chain of a silicone polymer is much greater than the chain of a hydrocarbon polymer. Whilst the hydrocarbon chain may be estimated to be 2.44×10^{-10} m, the diameter of the silicone chain can be calculated to be 4.05×10^{-10} m. So the percentage of the mucosa covered by a dimethicone chain cannot be greater than three-quarters of the total area: 41 percent of the length of the chain is covered by methyl groups, so the total free area is about $0.41 \times (244/4.05) = 0.249$ or 25 percent. Cyclopentasiloxane will only cover about 72 percent of the mucosa area due to a rigid ring structure. The outside of the cyclopentasiloxane ring is hydrophobic, meaning that it repels water, the inside is hydrophilic, it attracts water and makes the hole in the ring water permeable.

These properties are unique.

Silicone rebuilds the gradient of water pressure across the mucosa, which is necessary for a stable and healthy mucosa, without blocking the water flow.



Further information as well as advice on intimate issues with expert tips on pjurmed.com

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