

New wound healing properties of ficin researched

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Ficin, an enzyme derived from figs latex, has been found to be active against biofilms formed by *Staphylococcus*. The project is headed by Senior Research Associate of the Microorganism Genetics Lab Ayrat Kayumov and funded by Russian Science Foundation and Project 5-100. The results have been published in *Scientific Reports*.

Dr. Kayumov explains that currently, different enzymes are used for wound treatment, such as trypsin, chymotrypsin, or collagenase—they clear wounds from necrotic masses and [fibrin clots](#). He says, "If you treat [wounds](#) with an enzyme or protease, healing accelerates. Together with our Voronezh University colleagues, we decided to try ficin, which has not yet been studied well. It's worth mentioning that its close analog—papain derived from papaya—has already been introduced abroad. We have used ficin against biofilms and found that it works beautifully. Moreover, it has fared better than trypsin. The complexity of the issue is that in biofilms, bacteria are suspended in a matrix, like in a jelly, and antibiotics cannot penetrate. In order for them to become active, you have to increase the dosage significantly, sometimes a thousand-fold. But it's reasonable to assume that the effectiveness can increase if the matrix is disrupted."

The lab now considers testing other enzymes that can potentially be active against biofilms of various bacteria. Ficin is effective against *Staphylococcus* films because the latter include many proteins, but biofilms of bacilli, pseudomonades, and *E. coli* mostly contain polysaccharides, so the protease will not be effective against them.

A plant enzyme's great advantage is that it's not cytotoxic—a problem often affecting medications. Plant proteins are in general less allergenic compared to bacterial or animal proteins. However, ficin has not yet been sufficiently studied and has not been patented as a wound treating agent. Moreover, according to Dr. Kayumov, a technology for the increased [enzyme production](#) may be needed.

The team now plans to progress to clinical trials. The [enzyme](#) has been so far tested on lab rats.

More information: Diana R. Baidamshina et al, Targeting microbial biofilms using Ficin, a nonspecific plant protease, *Scientific Reports* (2017). [DOI: 10.1038/srep46068](https://doi.org/10.1038/srep46068)

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