

## Part 2 - COLD PLASMA: How does plasma affect bacteria?

### How cold plasma deactivates pathogens?

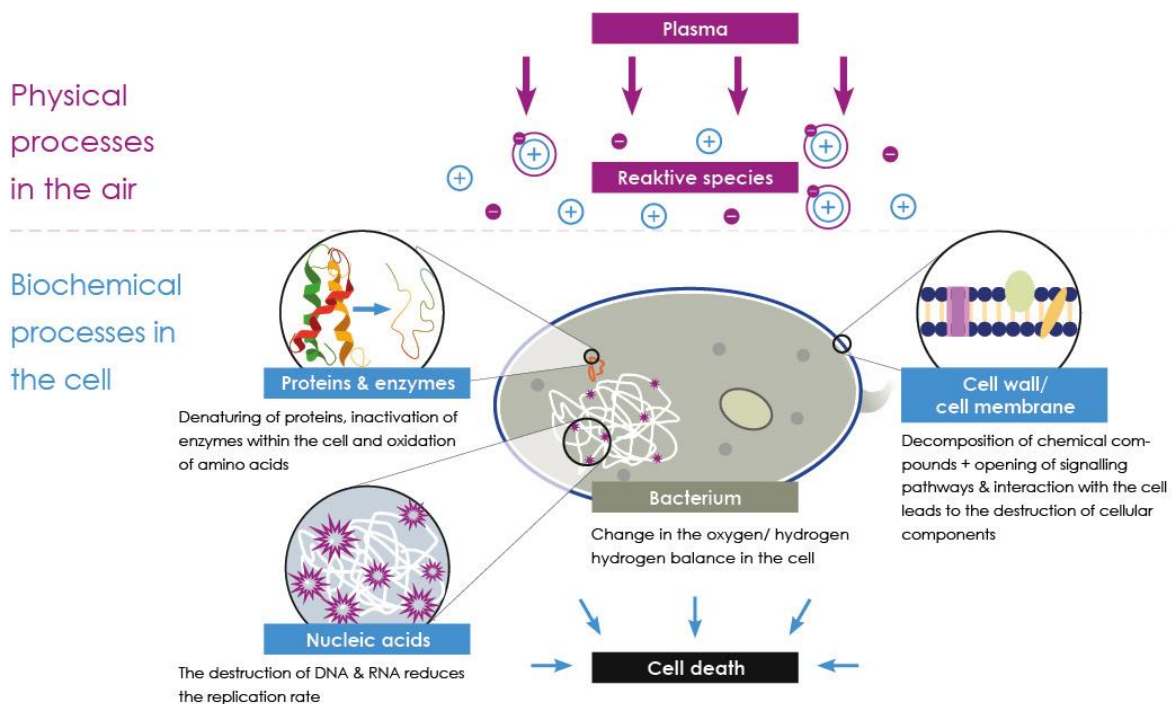
From Part 1 of this series, we know that cold atmospheric plasma (KAP for short) is a partially ionised gas that effectively and sustainably deactivates bacteria at body temperature. But what exactly happens to the pathogens during treatment with the mobile medical device plasma care®?

KAP acts in physical and chemical ways on prokaryotic cells, which include bacteria. Scientists have examined what exactly happens in various studies. They show that the cell membrane of the bacteria plays a decisive role.

### Reactive species on a deadly campaign

The physical effects are due to electrical fields on the cell surface. For example, they influence the charges and thus the reactivity of the individual molecules or atoms.

Chemical reactions are then decisive for the destruction, in which, for example, the short-lived reactive oxygen and nitrogen species interact directly with molecules of the bacterial membrane. As a result, chemical bonds in the cell wall break down and the protective barrier is breached.



Two types of bacteria, two modes of action

But not all bacteria are the same. There are gram-positive and gram-negative bacteria. They differ in the structure of their cell walls. The best-known bacterium, *Escherichia coli*, for example, is gram-negative. In contrast, *Staphylococcus aureus* -

a widespread germ that can lead to skin inflammation, among other things, if the immune system is weak - is a typical gram-positive pathogen.

Cold plasma leads to the deactivation of both types of bacteria - but in different ways. While in gram-negative bacteria oxidative stress causes the cell wall to break, in gram-positive bacteria it is mainly intracellular damage that ultimately leads to cell death.

In contrast, KAP has no negative effect on human, eukaryotic cells. On the one hand, their DNA is safely stored in the cell nucleus. On the other hand, the cell compound in which human cells are located offers further protection. plasma care® even stimulates growth and cell division and thus promotes wound healing. Find out exactly how in the third part of our cold plasma series.