# The Influence of Bacteria on Skin Cancer and The Fundamental Role of Photodynamic Therapy

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The strong influence of bacteria on the occurrence of serious human infections has become increasingly evident in the literature, and this also applies to skin cancer. The epidermis, one of the layers of our skin, has defense mechanisms and the ability to correct structural abnormalities caused by genetic mutations or physical damage, and its constitution makes it possible to balance the microbiota.

However, it is not only genetics that influences the transformation of a lesion into squamous cell carcinoma, for example. When there are changes in bacterial communities, dysbiosis occurs in the skin microbiome, and pathogenic bacteria trigger an inflammatory response in the immune system. Inflammation is a widely recognized factor in tumorigenesis, as well as being a determining factor in its progression. Overexposure of our skin to the sun's UV-A/B rays, for example, damages healthy cells and causes deterioration and dysfunction of the skin barrier. This physiological change in the skin causes its healthy microbiome to become dysbiotic, giving pathogenic microorganisms such as Staphylococcus aureus or even a multidrug-resistant one like MRSA (methicillin-resistant Staphylococcus aureus) a chance. The bacteria can therefore increase damage to the lesion, proliferate, colonize the lesion, and release toxins that induce chronic up-regulation of pro-inflammatory cytokines that can contribute to carcinogenesis. In addition, the therapeutic potential of photodynamic inactivation to contribute to specific and commensal bacterial species, such as Staphylococcus epidermidis, which compete with the pathogen to restore microbial eubiosis in the skin, is being studied from the perspective of microbial ecology. This study aims to use photodynamic therapy as the main tool for reducing the colonization of pathogenic and resistant bacteria and restoring the healthy microbiome. Therefore, the studies are carried out with pure and mixed cultures of the selected bacteria, so that the *in vitro* study becomes closer to the reality of a bacterial infection, which involves a whole diversity of microorganisms and their different forms of interaction.