

Biofilm and soluble virulence factors produced by *Staphylococcus* spp. strains isolated from skin microbiota in people with acne

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Background

Despite the progress made in understanding acne's physiopathology and the increasing therapeutic options, it still afflicts many people, in some cases with a long evolution and remaining scars, other times accompanied by different pathologies, like psychological ones. The imbalance of skin microbiota, including the bacteria's characteristics, such as production of soluble virulence factors and biofilm, is one of the most important factors in the majority of acne cases. Lately, some types of personalised medicine options, like autologous bacterial vaccine, have started to regain attention. We present the characterisation of soluble virulence factors and biofilm in *Staphylococcus* spp. strains isolated from the skin microbiota of patients with acne, subsequently treated with autologous bacterial vaccine.

Materials and methods

We enrolled 137 patients with acne, candidates for receiving autovaccine in 2017-2018. The taxonomy for isolated strains was confirmed through MALDI-TOF MS. 100 of the isolated strains were characterised regarding the soluble virulence factors by striking them on special media for detecting the production of caseinase, lecitinase, gelatinase, amilase, esculinase, lipase, DN-ase and haemolysins and analysing the specific effect in each case at 24, 48 and 120 hours. For 77 strains the biofilm production for 24, 48 and 72 hours was determined through a crystal violet microtiter method.

Results

Most frequent identified staphylococcal strains were *S. epidermidis* (32%), followed by *S. aureus* (27%), the rest being coagulase negative staphylococci. Regarding the soluble virulence factors, at 120 hours the strains most often produced caseinase (89%), lipase (73%), lecitinase (67%) and haemolysins (63%). For all the evaluated strains, the biofilm production was higher at 48 hours, with a slight decrease after 72 hours of incubation and was more intense for the strains of *S. epidermidis*.

Conclusions

In the skin microbiota of the included patients in this study, the most frequent staphylococcal specie was *S. epidermidis*, being also the one with the most intense biofilm production. An impressive caseinase and lipase production was noticed. The soluble produced virulence factors and biofilm production profile of these strains might be one of the reasons for the imbalance of skin microbiota and, in consequence, of acne development. Moreover, analysing these characteristics is of great importance in designing a personalised therapy approach.