

TITLE: Coagulase-negative *Staphylococcus* colonizing the skin of children with atopic dermatitis produce antimicrobial substances against members of the skin microbiota

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ABSTRACT:

Children with atopic dermatitis (AD), an inflammatory condition, are highly colonized by *Staphylococcus aureus* in their skin, which is associated with increased disease severity. On the other hand, coagulase-negative *Staphylococcus* (CoNS) species are often correlated with beneficials for the human beings. Nevertheless, few studies assessed their role in AD. This study aimed to evaluate the interaction among *S. aureus* and CoNS isolated from skin of children with AD. Two skin swabs (one skin with lesion and one skin without lesion) were taken from 30 children with AD. The swabs were plated into mannitol salt agar and about five mannitol-fermenting colonies and 10 non-fermenting from each skin site were selected. The isolates were identified by MALDI-TOF-MS and PCR. *Staphylococcus* spp. isolates were screened for antimicrobial substance (AMS) production against *S. aureus* ATCC 29213 or *S. epidermidis* ATCC 12228 by an overlay method as well as the determination of the composition of AMS and their activity against 30 strains. The most frequent species colonizing both skin sites in the AD group were *S. aureus* (100% of the children were colonized) and *S. epidermidis* (87%), while *S. hominis* (92%) and *S. epidermidis* (67%) were more frequent in the non-AD group. Seven hundred staphylococcal colonies (246 *S. aureus* and 454 CoNS) were screened for AMS production. None of the *S. aureus* isolates was able to inhibit the growth of *S. epidermidis*. On the other hand, 39 CoNS isolated from 8 AD children, mainly the species *S. epidermidis*, inhibited *S. aureus*. Most isolates produced proteinaceous AMS (possibly bacteriocins). Most of these isolates also inhibited representatives of species commonly found in the skin microbiota (*S. aureus*, *S. epidermidis*, *S. hominis*, *S. capitis*, *S. haemolyticus*, *S. saprophyticus* and *Micrococcus luteus*). In conclusion, even though a high number of AD patients was colonized by *S. aureus*, this species did not seem to inhibit *S. epidermidis*, a frequent skin colonizer. However, most of CoNS produced proteinaceous AMS against *S. aureus* isolates and were also able to inhibit other species commonly found colonizing the skin, highlighting the urge of studies investigating the role of CoNS in AD.

Keywords: atopic dermatitis; coagulase-negative *Staphylococcus*; *Staphylococcus aureus*; antimicrobial substances

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