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Novel antibacterial activity of monolaurin compared with conventional antibiotics against organisms from skin infections: an in vitro study

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PMID: 17966176

Abstract

Objective: A cross-sectional laboratory study to determine the in vitro sensitivity and resistance of organisms in culture isolates from skin infections and mechanisms of action of monolaurin, a coconut lauric acid derivative, compared with 6 common antibiotics: penicillin, oxacillin, fusidic acid, mupirocin, erythromycin, and vancomycin.

Methods: Skin culture samples were taken from newborn to 18-year-old pediatric patients with primary and secondarily infected dermatoses. Samples were collected and identified following standard guidelines, then sent to the laboratory for sensitivity testing against the 6 selected antibiotics and monolaurin.

Results: Sensitivity rates of Gram-positive *Staphylococcus aureus*, *Streptococcus* spp., and coagulase-negative *Staphylococcus*, Gram-negative *E. vulneris*, *Enterobacter* spp., and *Enterococcus* spp. to 20 mg/ml monolaurin was 100% and of *Klebsiella rhinoscleromatis* was 92.31%. *Escherichia coli* had progressively less dense colony growths at increasing monolaurin concentrations, and at 20 mg/ml was less dense than the control. *Staphylococcus aureus*, coagulase-negative *Staphylococcus*, and *Streptococcus* spp. did not exhibit any resistance to monolaurin and had statistically significant ($P < .05$) differences in resistance rates to these antibiotics.

Conclusions: Monolaurin has statistically significant in vitro broad-spectrum sensitivity against Gram-positive and Gram-negative bacterial isolates from superficial skin infections. Most of the bacteria did not exhibit resistance to it. Monolaurin needs further pharmacokinetic studies to better understand its novel mechanisms of action, toxicity, drug interactions, and proper dosing in order to proceed to in vivo clinical studies.

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