Efinaconazole 10% and Tavaborole 5% Penetrate Across Poly-ureaurethane 16%: Results of In Vitro Release Testing and Clinical Implications of Onychomycosis

Chris G. Adigun MD,a Tracey C. Vlahovic DPM,b Michael B. McClellan MS,c Kailas D. Thakker PhD,c Ryan R. Klein PhD,c Tuan A. Elstrom BS,d and Daniel B. Ward, Jr., MD4
Dermatology & Laser Center of Chapel Hill, Chapel Hill, NC • Temple University School of Podiatry, Philadelphia, PA • Tergus Pharma, LLC, Durham, NC • EPI Health, Charleston, SC

INTRODUCTION

Approximately half of all nail disease seen to be onychomycosis, a fact that is reflected in the medical and economic burden on healthcare systems worldwide. According to the World Health Organization, onychomycosis may be present in up to 10% of the population worldwide, and a nail infection may be present in at least 5% of the general population. Nails are the hardest structures found in the body and are a result of keratinization of the epidermis. The nail plate is thicker than any other part of the skin, and each of its layers is a structure composed of a single stratum of keratinocytes. The nails serve to protect the underlying structures and to help prevent infections by ensuring that the underlying structures remain moist-free. In addition, nails may serve as a barrier to the entry of foreign materials, and their composition and structure may be altered by disease states or conditions. The nail plate is composed of keratin, and this keratin is resistant to many types of chemical and physical agents, which makes it difficult to penetrate. The nail plate is composed of keratin, and this keratin is resistant to many types of chemical and physical agents, which makes it difficult to penetrate.

METHODS & RESULTS

METHODS

The in vitro diffusion cell model is a valuable tool for testing the ability of a drug to penetrate a barrier such as the nail plate. The model consists of a donor chamber connected to a receptor chamber by a semi-permeable membrane. The donor chamber contains a solution of the drug to be tested, and the receptor chamber contains a solution into which the drug can penetrate. The donor chamber is maintained at a constant temperature and concentration, and the receptor chamber is maintained at a lower temperature and concentration. The flux and permeability of the drug are determined by measuring the concentration of the drug in the receptor chamber over time. The flux and permeability of the drug are determined by measuring the concentration of the drug in the receptor chamber over time. The results of these experiments show that efinaconazole 10% and tavaborole 5% penetrate the polyureaurethane membrane at a rate of 755.5 ± 290.4 µg/cm²/hr and 42.0±16.1 nm/sec, respectively.

RESULTS

Table 1. Flux and Permeability of Efinaconazole and Tavaborole Across Polyurethane 16%

<table>
<thead>
<tr>
<th>Compound</th>
<th>Flux (µg/cm²/hr)</th>
<th>Permeability (nm/sec)</th>
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<tr>
<td>Efinaconazole 10%</td>
<td>755.5 ± 290.4</td>
<td>105.5 ± 20.4</td>
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<tr>
<td>Tavaborole 5%</td>
<td>42.0±16.1</td>
<td>115.0±20.5</td>
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DISCUSSION

The flux and permeability of efinaconazole 10% and tavaborole 5% are both much greater than the flux and permeability of other known topical antifungal agents. The high flux and permeability of these compounds suggest that they may be effective in treating onychomycosis.

CLINICAL IMPLICATIONS

The clinical implications of these findings are significant. These compounds may represent a new class of topical antifungal agents that can be used to treat onychomycosis. The high flux and permeability of these compounds may allow for more effective treatment of onychomycosis than currently available treatments.

REFERENCES