## **Toxicology and Clinical Pharmacology** &

2<sup>nd</sup> International Conference on

**Generic Drugs and Biosimilars** 

December 14-16, 2017 Rome, Italy

## Evaluation of the antifungal efficacy of sertaconazole nitrate containing formulations against Trichophyton rubrum in an infected nail plate model and comparison to ciclopirox-olamine containing formulations

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The antifungal efficacy of active pharmaceutical ingredients is highly important in the treatment of onychomycosis. In L this study, we examined the efficacy of various poloxamer 407 based formulations containing sertaconazole nitrate using an infected nail plate model. The results were compared to those from earlier studies with formulations containing ciclopirox-olamine, which showed similar efficacy to commercial products. Keratin films made of human hair and bovine hoof plates were used as a human nail plate model according to Lusiana et al. Both were infected with Trichophyton rubrum and subsequently treated with various formulations containing sertaconazole nitrate. Formulations consisted of poloxamer 407, medium-chain triglycerides, propylene glycol, isopropyl alcohol and water in varying ratios. We determined the antifungal efficacy by evaluating the fungal growth after 6 days and compared to formulations containing ciclopirox-olamine as a positive control. The inhibition of fungal growth varied between different formulations with up to 1% sertaconazole nitrate. In the current state of our research, the most effective formulation where no fungal growth was shown, contained 0.8% sertaconazole nitrate, which is close to maximum saturation. The efficacy was more dependent on the composition of the formulations rather than on the total amount of sertaconazole nitrate contained. The study shows that sertaconazole inhibits fungal growth in a previously established infected nail plate model. As expected, the efficacy depends on the composition of the formulation, with a high-water content especially seeming to have a positive impact. This is in accordance with the literature which describes that water hydrates the nail plate, leading to better permeation of drug molecules. Comparison of the same formulations containing either ciclopirox-olamine or sertaconazole nitrate underlines the importance of the interaction between formulation and active pharmaceutical ingredient: Some formulations showed the same efficacy, while others differed from the previous results with ciclopirox-olamine.

**Recent Publications** 

- 1. Täuber A, Müller Goymann C C (2014) Comparison of the antifungal efficacy of terbinafine hydrochloride and ciclopirox olamine containing formulations against the dermatophyte Trichophyton rubrum in an infected nail plate model. Molecular pharmaceutics. 11(7):1991-1996.
- Lusiana, Reichl S, Müller Goymann C C (2013) Infected nail plate model made of human hair keratin for evaluating 2. the efficacy of different topical antifungal formulations against Trichophyton rubrum in vitro. European Journal of Pharmaceutics and Biopharmaceutics. 84(3):599-605.
- Rajendra V B, Baro A, Kumari A, Dhamecha D L, Lahoti S R, Shelke S (2012) Transungual drug delivery: an overview. 3. Journal of Applied Pharmaceutical Science. 2(1):203–209.

## **Biography**

Tobias Kracht has completed his bachelors in pharmacy from Braunschweig, Germany in the year 2015. He is a licensed pharmacist in Germany (Approbation) since 2016. He is pursuing his PhD at TU Braunschweig since 2016.

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