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USING SKIN OF ONE-DAY-OLD MOUSE

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BIOASSAY OF CYTOCHALASIN E AND OTHER ELEVEN MYCOTOXINS  
USING SKIN OF ONE-DAY-OLD MOUSE

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ABSTRACT

The skin bioassay of cytochalasins and other eleven mycotoxins was studied in one-day-old mice. A total of 16 mycotoxins, dissolved in dimethylsulfoxide (DMSO), were employed in the present study. Cytochalasins B,C,D and E, patulin, roridin A and verrucarins A induced various degrees of erythema in dermis of one-day-old mouse when given s.c. whereas aflatoxins B<sub>1</sub>, citrinin, cytochalasin A, diacetoxyscirpenol, luteoskyrin, rubratoxin B, sterigmatocystin, T-2 toxin and zearalenone did not induce erythema even at the dose as high as 8.48 mg/kg BW, or lethal dose. Cytochalasin E at a dose of 0.106 mg/kg BW (0.16 µg/mouse) was the most potent metabolite among other cytochalasins to induce erythema with maximum area of 6.6 mm<sup>2</sup> and slight edema within 30 min after injection. And the inductive effect was dose-dependent. This erythema lesion persisted for 1 day and gradually disappeared within 2-3 days without any scar. Patulin (1.06 mg/kg BW) also induced erythema lesion to maximum area of 9.2 mm<sup>2</sup> accompanied by middle white zone within 30 min after injection. The lesion disappeared within 3 days with desquamated skin and scar. In contrast, roridin A (0.27 mg/kg BW) and verrucarins A (1.06 mg/kg BW) were able to induce severe edema and extensive erythema lesions with maximum area of 42.2 mm<sup>2</sup> and 39.3 mm<sup>2</sup> respectively at about 12 hr after injection. These lesions disappeared at the same time but without any scar. According to

the lesion of skin erythema, cytochalasin E caused extravascular effusion of most red and some white blood cells and also plasma through the widening of intercellular gaps between endothelial cells of capillaries and venules as observed under electron microscope. Therefore, this implies that a possible cause of death in rats when given i.p. was extravascular effusion of plasma through the enlargement of these intercellular gaps of capillaries and venules in the peritoneal cavity. In addition, the further comparative investigation for the sensitivity and specificity was performed in other two bioassay, there were inhibition of sperm motility and glucose transport in red blood cells of the rats. It was found that all cytochalasins A,B,C D and E at a concentration of 5.0 µg/ml could similarly induce an inhibition of sperm motility by 25-40% within 1-2 min of incubation. In contrast, only cytochalasin B at a concentration of 2.5 µg/ml and higher inhibited glucose transport in red blood cells by 65% within 60 min of incubation. Thus, skin bioassay was employed to estimate amount of cytochalasin E produced by Aspergillus clavatus NRRL 5890 on various solid substrates including corn, peanut, rice, mung bean, soybean and sorghum. This strain of A. clavatus produced cytochalasin E at a high concentration of 125.9 mg/kg in sorghum. It is therefore possible that skin bioassay in one-day-old mouse which is more sensitive, but less specific, may be used to estimate the amount of cytochalasin E and some other mycotoxins such as patulin, roridin A and verrucarin A.