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Does exposure to (1→3)-β-D-glucan cause release of EpDIF from guinea-pig isolated trachea?

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The (1→3)-β-D-glucans have recently been associated with inhalation toxicity. This is seen in indoor environments where there is exposure to bio-aerosols, and work environments which involve organic dusts e.g. cotton industry. Previous studies have shown that exposure to a (1→3)-β-D-glucan from baker's yeast (glucan (BY)) can cause hypo-responsiveness in guinea pig isolated tracheal spirals, Jones & Nicholls (1998).

The respiratory epithelium is capable of releasing a factor that exerts an inhibitory influence on the airway - Epithelium Derived Inhibitory Factor (EpDIF), Farmer & Hay (1991). Removal of the epithelium in guinea pig trachea enhances its sensitivity to various contractile agents, Holroyde (1986). The aim of this experiment was to ascertain if the hypo-responsiveness seen after exposure to glucan (BY) is mediated by release of EpDIF.

After sacrifice, the trachea from male Dunkin-Hartley guinea pigs (250-500g) was removed into Krebs solution. The trachea was cut into two halves, one half was then denuded of epithelium by passing a moistened wooden epithelial removing device through the lumen of the trachea, Holroyde (1986). Each tracheal half was then cut into a spiral and immersed in Krebs solution. After equilibration, a dose response (DR) curve to methacholine was established. The trachea was then immersed in 50 μg ml^{-1} glucan (BY) and 35 min into the exposure the DR curve was redetermined.

Figure 1 shows that there is no significant difference in the sensitivities of denuded and non-denuded trachea both pre and post glucan (BY) exposure. There is a significant rightward shift of the DR curve for both tissues post exposure ($P<0.05$ paired Student's t-test), this implies removal of the epithelium does not influence the hypo-responsiveness. This study indicates release of EpDIF is not involved in the inhibitory mechanism of glucan (BY).

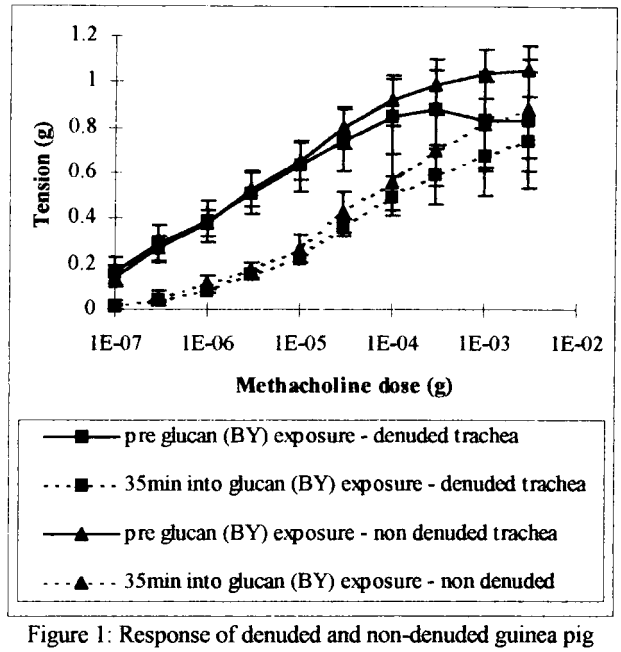

Figure 1: Response of denuded and non-denuded guinea pig trachea to methacholine in the presence and absence of glucan (BY) 50 μg ml^{-1}. Values = means ± s.e.m., n=6

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Farmer SG & Hay DWP (1991) The Airway Epithelium (Farmer & Hay eds.) Marcell Dekker Inc., NY: 437-483 (chpt.13)

Holroyde MC (1986) Br. J. Pharmacol., 87: 50-507

Jones A & Nicholls PJ (1998) Proc 22nd Cotton Dust Ref. Conf. (Wakelyn et al. eds.) Nat. Cotton Council, Memphis TN (In press)