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COMPARISON OF THE EFFECTS OF SOLUBLE AND PARTICULATE FORMS OF GLUCAN, AN IMMUNOMODULATOR, ON PROSTAGLANDIN SYNTHESIS BY RAT PERITONEAL MACROPHAGES

Gary J. Bowers, MD, Myra L. Patchen, PhD, Thomas J. MacVittie, PhD, Erwin F. Hirsch, MD, FACS, and Mitchell P. Fink, MD

GLUCAN, AN IMMUNOMODULATOR derived from the yeast *Saccharomyces cervesiae*, exists in two preparations, particulate (glu-P) and soluble (glu-F). Both preparations enhance host antibacterial and antineoplastic resistance (2). Unlike glu-F, glu-P is associated with granulomatous reactions within the reticuloendothelial system (RES) (3) and endotoxin sensitivity (1). Since some of the adverse effects of glu-P may be mediated by prostaglandins (PGs), we compared the effects of glu-P and glu-F on PG production by rat peritoneal macrophages (PMøs).

MATERIALS AND METHODS

Resident PMøs were incubated (10^6 cells/well) in minimum essential medium (MEM) at 37°C. After two hours, cells were washed, then stimulated for five hours with various concentrations of glu-P or glu-F in MEM (1.0 mL/well). Concentrations of immunoreactive (i) thromboxane (Tx) B_2 (stable metabolite of TxA_2) and i6-keto-$PGF_{1\alpha}$ (stable metabolite of PGI_2) were measured in culture supernatants by radioimmunoassay. Protein content of the PMø monolayer was determined using Bio-Rad. Prostanoid concentrations per microgram of protein were calculated, and the results were expressed as mean percentage (%) change ± standard error vs control (ie, no glucan). Differences between the groups were assessed by two-way analysis of variance, with drug and dose as independent sources of variation.

RESULTS

Glucan stimulation did not alter viability of the PMøs (trypan blue exclusion). Glucan P and F stimulated synthesis of PGs. As shown in Table 1, $iTxB_2$ increased with increasing doses of both drugs, glu-P being the stronger agonist. The concentration of i6-keto-$PGF_{1\alpha}$ in supernatants

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Table 1

PG	Glucan	Glucan dose (μg/mL)* 0.1	1.0	50	100	Statistics
TxB_2	F	60 ± 9	116 ± 20	337 ± 28	377 ± 30	Dose: $F_{3,72} = 26.8$, $P < 0.001$
	P	141 ± 17	212 ± 5	1,722 ± 265	2,010 ± 341	Drug: $F_{1,72} = 52.7$, $P < 0.001$
6-keto-$PGF_{1\alpha}$	F	150 ± 23	255 ± 28	412 ± 69	393 ± 59	Dose: $F_{3,72} = 21.6$, $P < 0.001$
	P	131 ± 15	181 ± 12	407 ± 24	473 ± 66	Drug: $F_{1,72} = 0.02$, $P < 0.05$

*N = 10.

also increased with larger glucan doses, but there was no difference in the effect of the two preparations.

DISCUSSION

Glucan-P, but not glu-F, evokes granuloma formation within the major RES organs, consisting of hypertrophic and hyperplastic macrophages (Møs) (2,3). Cotreatment with indomethacin attenuates glu-P-induced granulomogenesis while not interfering with ingestion of glu-P by Møs (3). These data suggest a role for PGs in the pathogenesis of glu-P-induced granulomas. We showed PG release by glucan-stimulated PMøs depends on the preparation of glucan employed. This observation may help explain why glu-F does not induce granuloma formation.

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