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Brief Communication

Effects of Orally Administered Endotoxin in Castrated Boars

The effects of oral administration of endotoxin (ET) have earlier been studied in sows *(Cort et al.* 1990) and prepubertal gilts *(Holst et al.* 1993a). Judging from the respective results, it appears that increasing age may increase the sensitivity to ET in feed. An age-related increase in sensitivity to i.v. ET has been demonstrated in rats *(Horan et al.* 1991). The objective of this study was to investigate the clinical, hematological, and blood biochemical response to orally administered ET in adult castrated boars.

The study comprised 4 castrated boars (3 Swedish Landrace; 1 Swedish Yorkshire; bw 125-190 kg). The animals were fed at 9 am and 3 pm with commercially prepared pelleted feed (1.5 kg each). Blood samples were drawn through permanent jugular vein cannulas during a 21h control period (every 2nd hour for 12h, then after 3 and 6h), then given ET feed at 9 am whereafter blood samples were drawn as during the control period. Rectal temperature (Temp) was measured and clinical status monitored in connection with the blood samplings. The blood was collected in plain, heparinized, and EDTA vacutainer tubes and used for the analysis of serum total bile acids (S-BA), serum glutamate dehydrogenase activity (S-GLDH), total white blood cell count, polymorphonuclear (PMN) and mononuclear (MN) white blood cell count, red blood cell count (B-RBC), platelet count (B-PLT), and plasma concentration of 15-keto-13,14-dihydroprostaglandin $F_{2\alpha}$ (P-PG). The methods for the analyses and the handling of the blood samples were as described elsewhere *(Holst et al.* 1993a,b). The animals received 300 mg each of ET from either *Klebsiella pneumoniae* (phenol-extracted, batch 47F-4010, Sigma) (nos. 1,2) or *Escherichia coli* (O55:B5, phenol-extracted, batch 17F-40191, Sigma) (nos. 3,4). The endotoxin was dissolved in water which was mixed with the regular ration of feed (400 ml/kg) and kept cool overnight. Since there were no obvious differences in response to the 2 types of ET used, the results were evaluated together. Concerning P-PG, the first blood sample during both the control and the experimental period were excluded from the evaluation since the value in the control period was high and probably affected by the over-night fast *(Holst et al.* 1993a). The Wilcoxon matched pair signed rank sum test was applied on mean values for a certain parameter during the animal's control and experimental period, respectively. For parameters where $p<0.2$, the outcome is denoted as a difference between the control and experimental period.

Cort and co-workers (1990) reported an obvious clinical effect of orally administered ET from *Enterobacter agglomerans* in 3 out of 5 adult sows. In this study, no such effect of ET was seen. The mean S-BA values were higher

Table 1. Mean values for various parameters during 21h (for P-PG 19h) before (B) and 21h after (A) oral administration of ET in 4 castrated boars.

Boar no		1.	2.	3.	4.
S-BA (mmol/l)	B	17.7	12.8	14.6	25.3
	A	28.7	22.2	18.4	28.2
S-GLDH (nkat/l)	B	26.1	21.0	33.0	25.2
	A	23.7	22.0	54.0	30.9
B-RBC ($x10^{12}$/l)	B	5.8	5.7	5.5	5.5
	A	6.0	5.6	5.7	5.6
B-PLT ($x10^9$/l)	B	377	414	483	419
	A	386	415	474	398
PMN ($x10^9$/l)	B	10.0	15.9	11.3	12.9
	A	8.1	17.5	11.4	15.5
MN ($x10^9$/l)	B	8.2	9.4	9.6	13.4
	A	8.5	10.0	10.1	12.7
P-PG (pmol/l)	B	110	216	266	391
	A	129	210	276	464
Temp (°C)	B	39.0	39.6	39.2	39.1
	A	38.9	39.8	39.5	39.3

during the experimental period but the remaining parameters revealed no difference between the control and experimental periods (Table 1). In S-GLDH and P-PG, increased mean values were detected in 3 out of 4 animals after ET feeding. This is worth mentioning as these 2 parameters are markers of ET influence *(Holst et al.* 1993a). Increased peripheral S-BA concentrations are known to be indicative of hepatic dysfunction in e.g. the mini-pig *(Kroker & Römer* 1984). Also in prepubertal gilts, increased S-BA has been detected following oral ET administration *(Holst et al.* 1993a). This is likely to depend on an increased uptake of ET from the intestine and a subsequent detoxification in the liver.

To conclude, nothing was found to indicate that adult castrated boars would be more sensitive than prepubertal gilts to the actions of orally administered ET.

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Henrik Holst
Department of Clinical Chemistry, Swedish University of Agricultural Sciences, Uppsala, Sweden.

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Reprints may be requested from: H. Holst, Department of Clinical Chemistry, Swedish University of Agricultural Sciences. P.O. Box 7038, S-750 07 Uppsala, Sweden.