INITIAL CHARACTERIZATION OF VASOACTIVE RECEPTORS IN THE POSTERIOR INTESTINAL VEIN OF THE SHARK, *SQUALUS ACANTHIAS*

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We have demonstrated recently that the receptor that mediates the vasoconstrictive effects of endothelin (ET) on the vascular smooth muscle (VSM) of the ventral aorta of the dogfish shark, *Squalus acanthias,* is of the ET_B-type (Evans et al., J. Comp. Physiol. (B) 165: 659-664, 1996). Mammalian arterial VSM generally expresses predominatly ET_A receptors, but more recent data suggests that ET_B receptors also may be expressed in this tissue, although their role in the actions of ET on arterial VSM remains unclear (e.g., Masaki, Annu. Rev. Pharmacol. Toxicol. 35: 235-255, 1995; Levin, New Eng. J. Med.333: 356-363, 1995; Kanaide, Gen. Pharrmac. 27: 559-563, 1996). On the other hand, venous VSM, and endothelial cells themselves, appear to express predominatly ET_B receptors (e.g., Sudjarwo et al., Biochem. Biophys. Res.Comm. 200: 627-633, 1994; White et al., Eur. J. Pharmacol. 257: 307-310, 1994). We have also demonstrated that the dogfish ventral aortic VSM expresses an endothelium-derived relaxing factor (EDRF), but that it is a PGE, rather than PGI_2 (prostacyclin) or nitric oxide (Evans and Gunderson, this Bulletin). Our present study was undertaken to characterize the ET receptor and EDRF expressed in the posterior intestinal vein of the dogfish shark.

The posterior intestinal vein (PIV) connects the posterior intestine and the spleen, and drains into the lienomesenteric vein. It was removed from pithed dogfish and placed into iced elasmobranch Ringer's. Paired rings of tissue (ca. 1mm in diameter and 3 mm long) were mounted for tension measurements as described previously for shark ventral aortic rings (e.g., Evans, J.Comp. Physiol. 162: 179-183, 1992; Evans and Gunderson, Bull. MDIBL 34: 109, 1995), except that the control tension was set at 200 mg, determined empirically to produce maximal responses to various effectors.

Removal of the vascular endothelium, by gentle rubbing of the vein intima with a roughed polyethylene tube, did not affect the ability of ET-1 to produce concentration-dependent contractions (N=6), with maximal tensions approaching 600-800 mg, 200-400% of the control, suggesting (as is the case with the shark aortic VSM) that dilatory ET_B receptors are not present on the endothelial cells. The endothelium-free PIV also responded to sarafotoxin S6c (a specific ET_B agonist) in a concentration-dependent manner, with an EC_{50} ca. $3x10^{-9}$ M (N=6), even less than the EC_{50} of ET-1 (ca. 10^{-8} M; N=5), suggesting that the receptor on the VSM of the PIV is of the ET_B type. This hypothesis was supported by the fact that BQ-123 (an ET_A-specific antagonist) did not change the concentration-dependent contraction produced by ET-1 (N=6). On the other hand, 4 μM BQ-788 (an ET_B-specific antagonist) did reduce the EC_{50} of ET-1 by about 50% (N=6). Application of nitric oxide (ca. 30 μM) and PGI_2 (1 μM) did not produce dilation (N=8) in ACh-precontracted PIV, but PGE_1 (1 μM) produced a small (10%), but significant ($p<0.05$) dilation (N=8), suggesting that the EDRF in the PIV of this species, like in the aorta is a PGE, not NO nor PGI_2. Thus, our data demonstrate that the posterior intestinal vein of the dogfish shark expresses receptors for endothelin, acetylcholine, and prostaglandin E, quite a complement for a tissue that is generally considered to be compliant rather than resistive.

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