NITRIC OXIDE INDUCED DILATION IN THE PNEUMATIC DUCT OF THE EEL (*ANGUILLA ROSTRATA*)

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In physostomous fishes, including the eel, *Anguilla rostrata*, the pneumatic duct (PD) extends from the swim bladder to the esophagus, although the opening into the esophagus is "functionally closed" in the eel (Scheid and Piiper, Hdbk. of Physiology-Comparative Physiol., Vol. 1, pp. 309-356, 1997). The PD is highly vascularized (via the same artery and vein that lead to the gas-secreting cells on the wall of the swim bladder) and serves as a site of gas reabsorption as the fish ascends in the water column. Since its homologue, the tetrapod trachea, responds to nitric oxide (NO) in mammals (e.g., Jakupaj et al. Am. J. Physiol. 273: L531-L536, 1997), we decided to test the sensitivity of the PD of the eel to NO.

American eels (*Anguilla rostrata*) were purchased from a local dealer and kept in running sea water. The pneumatic duct was dissected from double-pithed eels, and tissue rings were mounted in 20 ml of teleost Ringer's in the tension recording system that has been previously described for isolated aortic rings from the shark (e.g., Evans, Op. Cit., 1990 and Evans et al., Op. Cit., 1996). The rings were stabilized at 500 mg tension before precontraction with 10^{-4} M acetylcholine and subsequent addition of nitric oxide (NO). At each of the arrows in Fig. 1, sufficient saturated NO solution (in distilled water) was added to raise the experimental bath concentration by 4.2 μM . The experiment was done on four different pneumatic ducts; the figure below is representative.

It is obvious that the pneumatic duct of *A. anguilla* is exquisitely sensitive to NO, and that the induced dilation is rapidly reversed by a spontaneous contraction. Each subsequent addition of NO increased the degree of response and recovery. It is unknown if the reversal is mediated by some contractile agent (acetylcholine, endothelin?) that may be released in response to the initial dilation. It is clear that control of tension in the eel pneumatic duct warrants further investigation. (Supported by NSF IBN-9604824) NSF DBI 9531348