

Neural control of the pulsating vessels in the earthworm, *Metaphier* sp.

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The earthworm has the closed blood vascular system. Rhythmic peristaltic movements originating at the posterior end of the dorsal vessel conveys the blood anteriorly. Thus, the dorsal vessel may be referred to as the systemic heart. A part of the flow of blood in the dorsal vessel is distributed into the bypass vessels, called the lateral hearts, between the dorsal vessel and the ventral vessel to be flowed posteriorly in the ventral vessel. The lateral hearts are rhythmically contractile to carry the blood from the dorsal vessel and from the supraintestinal vessel to the ventral vessel.

We found nerves extending to the vessels from the ventral nerve cord by anatomical and histological observations. A bilateral pair of the first branches from the third roots of the segmental ganglion in the ventral nerve cord run to the septum membrane between the posterior body segments and its own segment where the lateral hearts are attached. The nerves running on the septum membrane send fine branches to the lateral heart and the dorsal vessel. The present investigation suggests that the pulsating vessels received serotonergic excitatory and GABAergic inhibitory innervation from the septum nerves.