The Topography of the Caudal Part of the Paraventricular Organ in *Rana temporaria*

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**Summary.** The results of a monoamine-fluorescence study of the hypothalamus of *Rana temporaria* show that the brain area corresponding with the nucleus infundibularis dorsalis (NID), as described in other species, does not differ, neither morphologically nor histochemically, from the paraventricular organ (PVO), with which it is anatomically continuous. It is concluded that a nucleus infundibularis dorsalis does not exist as a separate entity in this species.

**Key words:** Paraventricular organ — Amphibia — Nucleus infundibularis — Monoamine fluorescence.

**Introduction**

The paraventricular organ (PVO) or organon vasculosum hypothalami, a periventricular structure lying dorsally from the sulcus lateralis hypothalami, has been observed in several amphibian and other species (see Vigh, 1971). In the recent literature concerning monoamines in the amphibian brain, a smaller, but comparable, structure has been described in the neighbourhood of the caudal end of the PVO. This structure, called nucleus infundibularis dorsalis (NID) (Terlou and Ploemacher, 1973), is located laterally from the caudal end of the PVO, in the periventricular area of the recessus lateralis infundibuli.

In *Xenopus laevis* tadpoles the NID is separated from the PVO by a narrow zone of 50–150 μ (Van Oordt et al., 1972) in which green fluorescent neurons, similar to those of the PVO, occur (Terlou and Ploemacher, 1973). However, in the adult animals, the NID and the PVO are more closely associated. In several species of *Rana* and in *Bufo bufo*, the NID is incorporated in, and thus indistinguishable from the PVO (Terlou and Ploemacher, 1973). In *Rana esculenta* also, the NID may be regarded as the most caudal part of the PVO.
In *Bufo poweri*, authors of the same school (Chacko et al., 1974) described an arrangement of NID—PVO comparable with the situation in *Xenopus*, but the two structures are only separated from each other by a narrow zone of 40 μ.

Finally, in *Rana temporaria*, Prasada Rao and Hartwig (1974) described also a separate NID. Although they insisted on the fact that the PVO is not continuous with the NID, they found fluorescent neurons located in the area between the two structures, “suggesting their close relationship, or their possible anatomical continuity during some stages of ontogeny or in related species”.

According to their pictures, they are separated from each other by about 50 μ.

As this description did not seem to agree with our previous unpublished observations in *Rana temporaria*, the present investigation was carried out to verify these observations.

**Material and Methods**

Adult male frogs were adapted to an illuminated white background for 12 h prior to sacrifice. The animals were killed by decapitation. The brains were dissected out within 3 min, and frozen in a mixture of propane-propylene at the temperature of liquid nitrogen. Then they were treated for monoamine-fluorescence according to the Falck-Hillarp technique (Björklund et al., 1972).

The caudal end of the PVO lies closely to the sulcus lateralis infundibuli (Dierickx et al., 1970). Therefore, of four animals, sections of the diencephalon were made in a horizontal plane, parallel to this sulcus. In addition, of other animals, transverse serial sections of the diencephalon were made.

Fluorescence microscopy was done according to Ploem (1971).

**Results**

*Transverse* sections through the caudal region of the PVO showed exactly the same fluorescence picture as demonstrated by Prasada Rao and Hartwig (1974, Figs. 12–14). Indeed, the structure that they called NID was located laterally from the PVO, along the dorsal border of the recessus lateralis infundibuli.

However, *horizontal* sections, oriented in such a way that the PVO could be followed over its caudal half, undoubtedly demonstrated that “PVO” and “NID” were in fact continuous with each other. Indeed, as shown on Figures 1 and 2, an uninterrupted series of periventricular monoamine-containing neurons could be followed from the PVO, extending caudad around the caudal transition of the dorsal part into the ventral part of the tuber cinereum, and then again rostrad along the dorso-medial border of the recessus lateralis infundibuli. Consequently, these sections clearly demonstrated that the “NID” was an extension of the PVO into the recessus lateralis. It has to be noted that similarly oriented sections cut more dorsally or ventrally, frequently showed a narrow gap between the medial part of the PVO and its lateral part in the recessus lateralis. This was due to the fact that the extreme caudal point of transition between the ventral and the dorsal part of the tuber cinereum was not included in such