Vago-spinal anastomosis in the pig: anatomical and functional studies. O Rampin, JP Laplace, JC Marcilloux *(Unité de neurobiologie des régulations nutritionnelles, Station de physiologie de la nutrition, INRA, 78350 Jouy-en-Josas, France)*

Histology confirmed that the afferent and efferent pathways are almost completely separated at the level of the nodose ganglion on the cervical course of the vagus. In one nodose ganglion, we identified about 40 000 cell bodies responsible for the sensory function of the afferent vagus. The electro-physiological study of the vagus trunk evidenced 3 different classes of fibres. Their reponses were elicited by electrical stimulation (single pulse, 1 msec) of 0.15 V, 3 V and 8 V respectively. The corresponding conduction velocities were 30 m/sec^{-1}, 6 m/sec^{-1} and 3 m/sec^{-1}. The reinnervation of the mastoido-humeral muscle (MH) after vago-spinal anastomosis was used to study over 11 months the vagal function in relation to digestive motor events in conscious pigs. Electromyographic activities (EMG) recorded from MH proved the reinnervation to be effective 4 months after surgery. When the surgical procedure allowed afferent fibres to grow (Rousseau, 1970), the EMG of MH could only be related to motor events of the pharynx and proximal œsophagus. A similar EMG pattern of MH was found when the procedure led to a reinnervation by efferent fibres (Roman, 1966). These observations were confirmed by direct stimulation of the vagal branches under anaesthesia. The vago-spinal nerve anastomosis allows to study vagal afferent or efferent messages in conscious pigs, but questions arise concerning: i) the factors responsible for the selective growth of some vagal fibres in the spinal sheath and their ability to develop contacts with muscle fibres; ii) the origin of the recorded efferent messages, either central or evoked from the intact contralateral afferent pathway.

References

Roman C (1966) *J Physiol* (Paris) 58, 79-108

Rousseau JP (1970) Thèse Doc. Etat, Fac Sci Marseille, 156 pp.

Selective vago-spinal anastomosis to study function in the pig. JP Laplace, O Rampin, JC Marcilloux *(Unité de neurobiologie des régulations nutritionnelles, Station de physiologie de la nutrition, INRA, 78350 Jouy-en-Josas, France)*

The use of the vago-spinal nerve anastomosis to study vagal function in conscious animals was first described in sheep as: i) infra-nodose suture of the central end of the vagus to the peripheral end of the spinal nerve, resulting in the reinnervation of the neck muscle by vagal efferent fibers (Roman, 1966); ii) supra-nodose suture of the peripheral end of the vagus to the peripheral end of the spinal nerve , resulting in the reinnervation by vagal afferent fibers (Rousseau, 1970). We sucessfully used these 2 techniques in the pig. They allow to study either the afferent or efferent messages, or the modulation of the latter by the afferences from the contralateral intact vagus, through bulbar interneurons. However, the full section of the sutured vagal trunk does not allow the study of any ipsilateral reflex influence. The anatomical separation of afferent and efferent pathways on the cervical route of the vagus allowed us to avoid the complete transsection of the vagus. In 4 Pittmann-Moore miniature pigs, the left vagal afferent pathway was preserved while the ipsilateral efferent fascicle was sutured to the spinal nerve. This procedure allows to record muscle activities evoked by vagal efferences as a response to ipsilateral afferences. In 2 of these pigs, we performed in addition a selective suture of the right vagal afferent bundle. Such a model might allow the simultaneous recordings of the afferent firing and of the possible consecutive efferent firing, induced by peripheral stimulation of the digestive tract. Provided that the left and right vagus nerves have similar functions, this improved model could be very useful to study vagal reflexes in conscious pigs.

References

Roman C (1966) *J Physiol* (Paris) 58, 79-108

Rousseau JP (1970) Thèse Doc. Etat, Fac Sci Marseille, 156 pp.