DORSOLATERAL PERIAQUEDUCTAL GREY MATTER AND PONTINE A5 REGION CONNECTIVITY: A NEUROPHARMACOLOGIC AND ELECTROPHYSIOLOGICAL STUDY

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In this study, carried out in spontaneously breathing anesthetised rats, we have analysed the relevance of the interactions between the dorsolateral periaqueductal grey matter (dlPAG) and the A5 region, and how this sympathetic pontine region participates in modulating the cardiorespiratory response evoked from the dlPAG. Electrical stimulation of the dlPAG (1 ms pulses, 20-30 μA given at 100 Hz for 5s) was elicited, and the evoked cardiorespiratory changes were analysed before and after ipsilateral microinjections of muscimol (50 nl, 0.25 nmol, 5s) within the A5 region. DlPAG stimulation evoked the classical “defence response” characterized by tachipnoea, hypertension and tachycardia. Tachipnoea consisted of an inspiratory facilitatory response [increase in respiratory rate ($p<0.001$) due to a decrease in expiratory time ($p<0.01$)] and was accompanied by a pressor ($p<0.001$) and tachycardic ($p<0.001$) response. Microinjection of Muscimol within the A5 region reduced all, pressor ($p<0.05$), heart rate ($p<0.001$) and respiratory ($p<0.001$) responses evoked by electrical stimulation of dlPAG. Finally, extracellular recordings of putative A5 neurones were obtained during dlPAG electrical stimulation in order to assess functional interactions between A5 and dlPAG. Forty A5 cells were recorded, 16 of which were affected by dlPAG (40%). With these results, we can conclude that neurones of the A5 region possibly modulate the cardiorespiratory response evoked from the dlPAG.

A5 Region; dlPAG; cardiorespiratory control; rat