

Protein kinase C in the carotid body

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INTRODUCTION AND METHODS. The carotid body is a paired chemosensory organ that responds to changes in the chemical stimuli in the arterial blood and reflexly, through the brain stem respiratory areas, adjust pulmonary ventilation to the current metabolic requirements. The hyperventilatory response to hypoxia is the prime example of the powerful carotid body function (1). The underlying cellular mechanisms of this function are elusive and are under a heated debate. In a previous study we found that phosphoinositide-specific phospholipase C (PLC) is present in the ex vivo normoxic carotid body and is elaborated in the hypoxic carotid body (2). One of the downstream signaling molecules, capable of triggering the cellular responses, activated by PLC-induced diacylglycerol is protein kinase C (PKC) (3). In this study we followed up this line of research and set out to establish the presence of PKC in the carotid body. We employed immunofluorescent light microscopy. Carotid bodies were dissected from anesthetized and perfused through the aorta cats. Six micrometer cryostat sections of the tissue were processed immunohistochemically, first with isoform-specific monoclonal mouse anti-PKC antibodies followed by secondary polyclonal anti-mouse antibody conjugated with a fluorophore.

RESULTS AND DISCUSSION. We found that α PKC and λ PKC isoforms were expressed in the carotid chemoreceptor cells. Fig. 1 shows immunofluorescent staining in the clusters of these cells. Other PKC isoforms such as ι PKC was expressed explicitly in the endothelial and perithelial cells. Other isoforms such as β , γ , δ , or μ were interspersed in other structural elements of the organ. This study centers attention on the presence of specific PKC isoforms in the carotid chemoreceptor cells. That presence along with the elaboration of molecular activators of PKC by hypoxia (2) raises a reasonable assumption that the enzyme might have a part in the cellular transductive pathway incoming chemical stimuli into increased afferent impulse traffic in the nerve endings apposed synaptically to the chemoreceptor cells. The exact role of PKC in the carotid body function and the determinants of this role remain to be established.

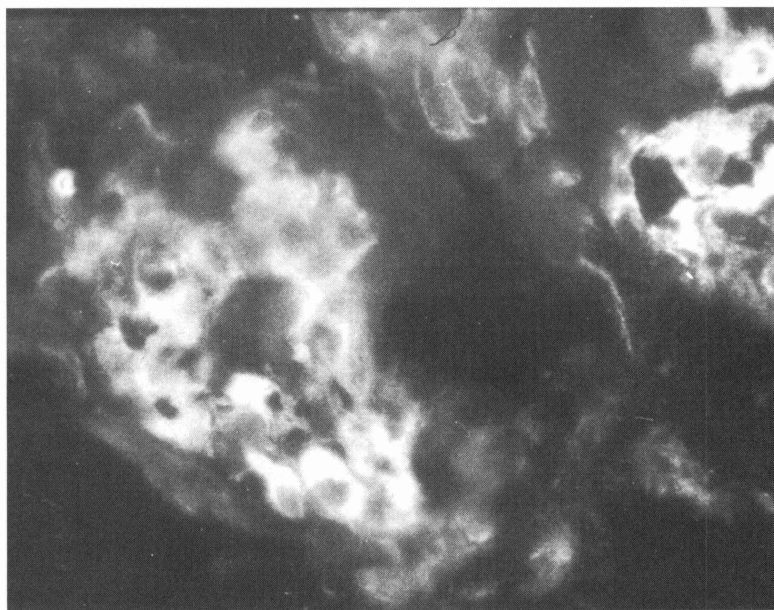


Fig. 1. Immunofluorescent staining of carotid chemoreceptor cells with an anti-PKC α antibody. Magnification x 600.

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