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RECEPTORS FOR VASOACTIVE INTESTINAL PEPTIDE AND PITUITARY ADENYLATE CYCLASE-ACTIVATING POLYPEPTIDE IN THE GOOSE CEREBRAL CORTEX

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Receptors for vasoactive intestinal peptide (VIP) and pituitary adenylate cyclase-activating polypeptide (PACAP) in the goose cerebral cortex were characterized using two approaches: (*1*) *in vitro* radioreceptor binding of [^{125}I]-VIP, and (*2*) effects of peptides from the VIP/PACAP/secretin family on cyclic AMP formation. The binding of [^{125}I]-VIP to goose cortical membranes was rapid, stable, and reversible. Saturation analysis resulted in a linear Scatchard plot, suggesting binding to a single class of receptor binding sites with a high affinity (K_d = 0.76 ± 0.13 nM) and high capacity (B_{max} = 70 ± 7 fmol/mg of protein). Various peptides displaced the specific binding of 0.12 nM [^{125}I]-VIP to the goose cerebral cortical membranes in a concentration-dependent manner. The relative rank order of potency of the tested peptides to inhibit [^{125}I]-VIP binding to the goose cerebrum was: $PACAP_{38}$ ≈ mammalian VIP ≥ $PACAP_{27}$ ≈ chicken VIP >>> PHI (peptide histidine-isoleucine) >> secretin (inactive). About 52% of specific [^{125}I]-VIP binding sites in the goose cerebral cortex was sensitive to 5'-guanylimidodiphosphate [Gpp(NH)p], a nonhydrolyzable analogue of GTP. $PACAP_{38}$ and $PACAP_{27}$ potently stimulated cyclic AMP formation in the goose cerebral cortical slices in a concentration-dependent manner, displaying EC_{50} values of 45.5 nM and 51.5 nM, respectively. Chicken VIP was markedly less potent than both forms of PACAP, mammalian VIP only weakly affected the nucleotide production, while effects evoked by PHI were negligible. It is concluded that the cerebral cortex of goose contains VPAC type receptors that are labeled with [^{125}I]-VIP and are positively linked to cyclic AMP formation. In addition, the observed stronger action of PACAP, when compared to VIP, on cyclic AMP production in this tissue suggests its interaction with both PAC_1 and VPAC receptors.

Key words: *goose, brain, vasoactive intestinal peptide (VIP), pituitary adenylate cyclase-activating polypeptide (PACAP), VPAC receptors, cyclic AMP*

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