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Detection of Endogenous Acetylcholine Release from the Rat Basal Forebrain Slices

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〔第60回　日本薬理学会総会（昭和62年4月1日，千葉市）で発表〕

We have developed a specific highly sensitive radioimmunoassay for acetylcholine (ACh). In the present study, an attempt was made to determine endogenous ACh released from the rat basal forebrain slices. The brain slices (40—60 mg protein) were placed in the perfusion chamber (0.3 ml) and perfused with artificial cerebrospinal fluid (37°C, 0.4 ml/min). Fractions were collected every 3 min and determined for ACh contents. In the normal condition (without cholinesterase (ChE) inhibitor), no detectable amount of ACh was present in the superfusates. Thus, a medium containing methanesulfonyl-fluoride (10 μM) was perfused to inhibit ChE. Under these conditions, spontaneous release of ACh was detected (0.56±0.04 pg/mg protein/min). Atropine-sulfate (up to 10 μM) and pirenzepine-hydrochloride (1 μM) evoked an increase in ACh release. Thus, M_1-muscarinic autoreceptor seems to be activated by spontaneously released ACh in the presence of ChE inhibitor.

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Determination of Plasma Acetylcholine Concentrations in Rabbits and Humans

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It is generally considered that acetylcholine (ACh) is rapidly hydrolyzed by acetylcholinesterase (AChE), and no detectable amount is present in the blood. By using a specific and sensitive radioimmunoassay (RIA) for ACh, the present stydy was conducted to confirm whether there is any measurable amount of ACh in plasma. Venus blood sample was collected into a cooled vacutainer containing EDTA, paraoxon and acetic