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cyclic nucleotides in rat brain during the estrous cycle were studied using seven brain regions obtained from S. D. strain rats maintained on a 12 hr light-dark schedule. The estrous cycle was classified into the 5 phases proposed by Nakao and Takeichi (Tokyo Jikeikai Ikadaigaku Zasshi; 71 : 396, 1955). The contents of cyclic AMP and cyclic GMP were assayed by the RIA method. In all regions of the brain except the hypothalamus, the levels of cAMP were highest in estrus II (E II), subsequently decreased in diestrus I (D I) and diestrus II (D II), rose again in proestrus (P), and reverted to minimum levels during estrus I (E I). In the hypothalamus, the level of cAMP rose, earlier on, in D II and gradually fell to the lowest level in E I with no elevation in P. The pattern of cGMP was similar to that of cAMP in 5 regions of brain except cerebellum and hypothalamus, where each peak was observed in P and D II, respectively. Estradiol (0.2mg/kg, i.p.) significantly increased cAMP levels in the hypothalamus, striatum and midbrain, and cGMP in the hypothalamus and hippocampus. In another regions, an increasing tendency was observed, whereas progesterone (4mg/kg, i.p.) did not result in significant effects in either cyclic nucleotide except for an increase in cGMP levels in the cerebellum.

子宮内膜中の Monoamine Oxidase 活性および Cyclic AMP, Cyclic GMP の Estrous Cycle による変動

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〔日本薬学会 第98年会 (1978年4月) で発表〕

〔目的〕我々は脳内, 副腎中の monoamine oxidase (MAO), tyrosine hydroxylase など catecholamine 関連酵素の変動について検討してきた。今回は正常ラットの子宮内膜の MAO 活性と, catecholamine と関連の深い cyclic AMP (cAMP), cyclic GMP (cGMP) 含量の性周期による変動について検討した。

〔方法〕温度 $22 \pm 2^{\circ}\text{C}$, 湿度55%の空調室で2週間以上飼育した10週令前後の S. D. 系雌性ラット (体重約200g) を用いた。Smear を1日2回 (8, 20時) 観察し, 性周期は中尾, 武市による分類法に準じて Diestrus I (DI, 間期第1日目, EIIから12時間後), Diestrus II (DII, DIより24~36時間後), Proestrus (P, 有核細胞のみ), Estrus I (EI, 有核細胞と角化細胞がほぼ1:1), Estrus II (EII, 角化細胞のみ) の5期に分け, 正常の性周期を示すラットのみを使用した。MAO 活性の測定は断頭後直ちに子宮を摘出採取した内膜の 0.1M Tris-HCl buffer homogenateを酵素材料として ^{14}C -tyramineを基質に用いる大塚, 小林の方法を改変した放射化学法によって行った。cAMP, cGMP は断頭後摘出した子宮に microwave を照射して内在酵素の活性を停止させ, 内膜の生理食塩水homogenateのTCA抽出物を材料としてRIA法で測定した。

〔結果・考察〕子宮内膜中の MAO 活性はP期に最も高く, D期に低いという性周期に伴う変動がみられた。cGMPの変動は MAO 活性と同様のパターンを示したが, cAMP はP期には比較

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的低く、E I 期にピークが現われた。卵巣摘出（14日後）によって MAO 活性は有意の上昇を、cyclic nucleotides はやや減少傾向を示した。卵巣摘出ラット（対照群とする）に steroids を投与したとき、MAO 活性は estradiol で低下し、progesterone で対照群レベルに回復し、cGMP は MAO 活性と類似した態度を示したが、cAMP は逆に estradiol で有意に増加、progesterone で著明に減少した。MAO 活性の性周期による変動パターン、あるいは投与された steroids による影響は cGMP のそれと類似するが、cAMP との間には関連が認められない。P 期は estrogen の血中濃度の最も高い時期といわれ、いわゆる critical period に相当する。子宮内膜中の MAO 活性あるいは cyclic nucleotides の性周期による変動は内因性の estrogen レベルとは直接の関連性を持たないと考えられる。

Monoamine Oxidase Activity in Rat Brain and Estrous Cycle

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The activity of monoamine oxidase (MAO) during different phases of the estrous cycle was studied using seven brain regions obtained from S.D. strain rats by the method of Glowinski and Iversen. The enzyme activity of homogenate of each tissue was assayed by our modified Otsuka's method using ^{14}C -tyramine as substrate. In most regions of the brain, MAO activity was highest in proestrus, subsequently fell in estrus I, rose again slightly in estrus II in the regions except hypothalamus, and turned to a lower level during diestrus. Hypothalamus and medulla oblongata showed highest activity in proestrus among the rest. This pattern of fluctuation of MAO activity in the brain differed from that in endometrium in the point that the level of the activity in the later was lowest in estrus II. 17β -Estradiol (0.2mg/kg/day for 3 days) depressed the activity, whereas progesterone (4mg/kg/day for 3 days) had a tendency to elevate the activity, when these were injected subcutaneously to intact or ovariectomized rats. The pattern of the activity in hypothalamus resembles that of plasma levels of estrogens during sexual cycle. The peak of the activity seems to come almost simultaneously with the so called critical period. And then, the fluctuation of MAO activity in hypothalamus can not be attributed to the levels of endogenous steroids.