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P B 'LSD' cf. 'antiserotonin' BOL 'lysergic-acid' methysergide /Sandoz/ 'sympatholytic' 'phenol-ether' alprenolol 'phentolamine' /CIBA-Geigy/ 'isoprenaline' /Sigma-Chem./ 'dopamine' /Calbiochem/ 'claviceps' metergoline /Farmitalia/ 'psychosedative' 'thiepin' methiothepin /Roche/ 'serotonin' /Merck-USA/ etc. influence on tritium-labeled dihydroalprenolol 'receptor' binding isoprenaline-stimulated 'lyase' adenylate-cyclase act. 'brain' cortex C6-glioma-cell in-vitro rat /XIV/ /XXVI/ /XXXII/

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Direct Interaction of LSD with Central "Beta"-Adrenergic Receptors

The interaction of LSD and serotonin agonists and antagonists with central β-adrenergic receptors was investigated

Methods

Binding of ^{3}H-dihydroalprenolol (^{3}H-DA) and activity of isoproterenol-sensitive adenylate cyclase were measured in rat cerebral cortex homogenates and C6 glioma cell cultures after incubation with the test substances. The following drugs were tested: LSD, 2-bromo-lysergic acid diethylamide (BOL), methysergide (all Sandoz), alprenolol, phentolamine (both CIBA-Geigy), isoproterenol (Sigma-Chem.), dopamine (Calbiochem), methergoline (Farmitalia), methiothepin Roche), 5-methoxy-N,N-dimethyltryptamine, bufotenine (Regis), fluphenazine (Squibb), sulpiride (Delagrange), mescaline and serotonin (both Merck-USA).

Results

LSD competitively inhibited ^{3}H-DA binding with an apparent inhibition constant of 10^{-7}M in cerebral cortex and 10^{-6}M in C6 glioma cells. LSD completely displaced ^{3}H-DA binding in rat cortex with a dissociation constant of 1.9×10^{-7}M as compared to 1.4×10^{-8}M for alprenolol and 5.6×10^{-9}M for isoproterenol. BOL, had the same affinity as LSD for α-adrenergic receptors. The other dopamine and serotonin agonists and antagonists had no effect when tested at 10^{-6}M. The stimulation of adenylate cyclase by isoproterenol was inhibited by LSD with an apparent inhibition constant of 1.6×10^{-7}M in cerebral cortex homogenates and 5×10^{-6}M in the C6 glioma cell system.

Conclusion

The central β-adrenergic receptors are 1 of the multiple sites of action of LSD.

4 Fig. 21 Ref. NA11/PM/WS

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