The Daily Rhythm of HVA, VMA, (VA) and 5-HIAA in Depressionsyndrom

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Received December 15, 1973

Summary

The daily rhythm (8—14 h, 14—20 h, 20—2 h, 2—8 h) of HVA, VMA, (VA) and 5-HIAA was studied in 21 depressed patients and was compared to the values of 13 healthy subjects. In healthy subjects all compounds trend to high values during day-time and significant lower values in the night-phase (2—8 h). Depressed patients did not show a significant rhythm during the four fractions; the values of HVA and VMA were significant lowered in the morning-phase (8—14 h). This demonstrates a good connexion to the clinical feature with the morning listlessness. Normal concentrations were reached in the night-phase (2—8 h). 5-HIAA did not show any significance between healthy subjects and depressed patients during the circadian rhythm. The ratio VMA/HVA in healthy subjects fell significant from morning-phase (8—14 h) to night-phase (20—2 h, 2—8 h). In depressed patients the ratio was approximately equal in all fractions. Whereas the ratio 5-HIAA × 100/VMA + HVA increased from the morning-phase to the night-phase in healthy persons, this ratio did not show any significance in the four fractions of depressed patients.

Also these results suggest some importance in explaining the lost of drive in the activity of depressed patients during morning hours and the remission of these patients often observed in the evening. A very good correlation to the clinical feature is emphasized.

Preliminary studies on 6 patients with different depressive diagnosis during depression- and remission-phase gave a different biochemical pattern. Further extended studies have to be carried out to differentiate exactly between nosological different depressions.
Introduction

The most important biochemical data concerning the depression syndrome, special the endogenous or masked endogenous depression, demonstrate the fact, that depression syndrome seems to consist or to be influenced by various factors, which are overlapping and probably in various patients at different phases of the disease pronounced in several ways. The heterogeneous pattern could be a reason for the discrepancies of biochemical findings in this disease (Table 1). Between—patient differences and within—patient fluctuations might be important factors in the disturbances concerning circadian rhythms of biological functions in depression syndrome and make the managing and organisation of biochemical studies much more difficult.

Characteristic diurnal changes in the concentration of L-tyrosine in the plasma of humans were demonstrated by Wurtman (1967, 1972) and Zigmond (1970). L-Tyrosine levels were lowest between 2—4 a.m. and highest in the midmorning. Birkmayer (1970) estimated the L-tyrosine-concentration in healthy subjects and depressed patients and demonstrated an invers diurnal rhythm in depression syndrome. Benkert (1970, 1971) agreed with these findings and Klernpel (1972) suggested, that an inversal daily rhythm would be an essential component of the pathological divergence. In depressed patients L-tryptophan and L-tyrosine was shown to change in response to the disease state (Riederer, 1973).

Kärki (1956), von Euler (1955), Becker (1970), Townshend (1973) and Winkel (1973) reported on the daily rhythm of several important biochemical enzymes:

Abbreviations

HVA = Homovanillic acid (3-Methoxy-4-hydroxy-phenyl-acetic acid)
VMA = Vanillic-mandelic acid (3-Methoxy-4-hydroxy-mandelic acid)
VA = Vanillic acid (3-Methoxy-4-hydroxy-benzoic acid)
5-HIAA = 5-Hydroxyindol-3-acetic acid
MHPG = 3-Methoxy-4-hydroxy-phenylglycol
NM = Normetanephrine = 1-(3-Methoxy-4-hydroxyphenyl)-2-amino-ethanol
MET = Metanephrine = 1-(3-Methoxy-4-hydroxyphenyl)-2-methylamino-ethanol
NA = Norepinehrine = 1-(3, 4-Dihydroxyphenyl)-2-amino-ethanol
A = Epinephrine = 1-(3, 4-Dihydroxyphenyl)-2-methylamino-ethanol
5-HT = Serotonin (5-Hydroxytryptamine)
TYR = L-Tyrosine
TRY = L-Tryptophan
TRA = Tryptamine
PEA = Phenyl-ethyl-amine
COMT = Catechol-O-methyltransferase
L-DOPA = 3, 4-Dihydroxyphenylalanine