Chapter 5

Neurology of Human Affection and Love

Introduction

Human affection and love involve changes in the neurotransmitters of the brain. The neurotransmitter dopamine and the opioid peptides are involved in this respect. Falling in love has an obsessive component and serotonin depletion is involved in obsessive neurosis. The neurotransmitter serotonin is responsible for transient love while endorphin causes compassionate love. When one is in love head over heels, endorphins are released to the maximum. An alkaloidal neurotransmitter, anandamide in the brain when activated causes love. The initial surge of excitement on seeing the person who is the focus of affection is mediated by the neurotransmitters, noradrenaline and dopamine both of which causes arousal. These are activated in the hypothalamus by visual cues when someone meets a person to whom one is attracted. The present study deals with the changes in the archaeal digoxin and neuroactive compounds in people who are prone to fall in love and compares it with those who are not prone to it.

Results

(1) The results showed that people who tended to fall in love had decreased HMG CoA reductase activity and serum digoxin as well as increased RBC Na^+-K^+ ATPase activity and serum magnesium levels. The results showed that people who tended not to fall in love had increased HMG CoA reductase activity and serum digoxin levels with reduced RBC membrane RBC Na^+-K^+ ATPase activity and serum magnesium levels.

(2) The results showed that people who tended to fall in love had increased levels of tyrosine and its catabolites - dopamine, noradrenaline, morphine and reduced levels of tryptophan and its catabolites - serotonin, quinolinic acid, strychnine and nicotine. The results showed that people who tended not to fall in love had decreased levels of tyrosine and its catabolites -

dopamine, noradrenaline, morphine and increased levels of tryptophan and its catabolites - serotonin, quinolinic acid, strychnine and nicotine.

(3) Serum digoxin levels were increased and RBC Na^+-K^+ ATPase activity reduced in right hemispheric dominant individuals. Serum digoxin levels were reduced and RBC Na^+-K^+ ATPase increased in left hemispheric dominant individuals. The bihemispheric dominant individuals had intermediate values. The levels of tryptophan, serotonin, quinolinic acid, nicotine and strychnine were elevated and that of tyrosine, dopamine, noradrenaline and morphine decreased in right hemispheric dominant individuals. The levels of tryptophan, serotonin, quinolinic acid, nicotine and strychnine were decreased and that of tyrosine, dopamine, noradrenaline and morphine increased in left hemispheric dominant individuals.

Discussion

Archaeal Digoxin and Membrane Na^+-K^+ ATPase Inhibition in Relation to Affective Behaviour

The archaeaon steroidelle DXP pathway and the upregulated pentose phosphate pathway contribute to digoxin synthesis. The results showed that people who tended to fall in love had decreased digoxin synthesis and increased membrane Na^+-K^+ ATPase activity with increased serum magnesium levels. The low levels of digoxin could be due to its reduced synthesis. Studies from our laboratory have demonstrated the synthesis of endogenous digoxin by the isoprenoid pathway. Low levels of digoxin can stimulate membrane Na^+-K^+ ATPase activity. Membrane Na^+-K^+ ATPase stimulation can lead to an increase in intracellular magnesium and a reduction in intracellular calcium.

Archaeal Digoxin and Regulation of Neurotransmitter Synthesis and Function in Relation to Affective Behaviour

The archaeaon neurotransminoid shikimic acid pathway contributes to tryptophan and tyrosine synthesis and catabolism generating neurotransmitters and neuroactive alkaloids. The low level of digoxin is responsible for the increased neuronal tyrosine load and reduced neuronal tryptophan load in these groups of patients. Digoxin promotes the neutral amino acid - tryptophan transport over tyrosine. These groups of individuals with a tendency to fall in love also had elevated levels of tyrosine catabolites - dopamine, noradrenaline and morphine. Previous studies have demonstrated synthesis of endogenous morphine from tyrosine. Dopamine and morphine are concerned with bonding behaviour. Increased level of noradrenaline contributes to the surge of excitement on seeing the concerned person. The tryptophan catabolites-serotonin, strychnine and nicotine are decreased in these individuals. Studies from our laboratory have demonstrated the synthesis of endogenous strychnine and nicotine from tryptophan. An element of obsessive neurosis is associated with falling in love. Serotonin depletion is associated with obsession. The low level of serotonin consequent to its reduced synthesis from tryptophan contributes to the obsessive features in these groups of individuals. The reduced synthesis of strychnine and nicotine is also significant. Strychnine blocks the glycinergic inhibitory transmission in the brain. Reduced glycinergic inhibitory transmission can lead to the tendency to fall in love. This has not been reported before. Also there is decreased synthesis of nicotine which promotes cholinergic transmission. Reduced cholinergic transmission could also be associated with this behavioural pattern. In the presence of hypermagnesmia consequent to membrane Na^{+}-K^{+} ATPase stimulation, the Mg^{++} block on the NMDA receptor is strengthened leading on to reduced NMDA transmission. The decreased presynaptic neuronal Ca^{++} can produce decreased cyclic AMP dependent

phosphorylation of synapsins resulting in decreased neurotransmitter release into the synaptic junction and vesicular recycling. Decreased intracellular Ca^{++} in the post synaptic neuron can also inhibit the Ca^{++} dependent NMDA signal transduction. The plasma membrane neurotransmitter transporter (on the surface of the glial cell and presynaptic neuron) is coupled to a Na^{+} gradient which is stimulated by the activation of Na^{+}-K^{+} ATPase, resulting in increased clearance of glutamate by presynaptic and glial uptake at the end of synaptic transmission. By these mechanisms, stimulation of membrane Na^{+}-K^{+} ATPase can inhibit glutamatergic transmission. The low levels of quinolinic acid, strychnine and serotonin can also contribute to reduced NMDA transmission. Quinolinic acid, strychnine and serotonin are also positive modulators of the NMDA receptor. Strychnine displaces glycine from its binding sites and inhibits glycinergic inhibitory transmission in the brain. The glycine is free to bind to the strychnine insensitive site of the NMDA receptor and promote excitatory NMDA transmission. Decreased glutamatergic transmission associated with hypodigoxinemia is associated with a tendency to fall in love. Decreased cholinergic and glutamatergic transmission is associated with impulsive behaviour and lack of activation of the decision making pathways of the brain. Impulsive behaviour is associated with a tendency to fall in love. Increased glutamatergic and cholinergic transmission is associated with high IQ and intellectual function. Individuals with higher intellectual capability tend to have a decreased predilection to fall in love.

Archaeal Digoxin and Hemispheric Dominance in Relation to Affective Behaviour

The archaeaon related organelle - steroidelle, neurotransminoid and vitaminocyte contribute to hemispheric dominance. The neurotransmitter patterns of elevated dopamine, morphine and noradrenaline and reduced

serotonin, strychnine and nicotine is associated with left hemispheric dominance. Left hemispheric dominant individuals may have an increased predilection for falling in love. Right hemispheric dominant individuals tend to be detached and unaffectionate because of the elevated digoxin synthesis and reduced levels of dopamine and morphine, concerned with bonding behaviour. Right hemispheric dominant individuals tend to have decreased predilection to fall in love. Hypothalamic archaeal digoxin and hemispheric dominance may regulate the tendency to fall in love.

References

[1] Kurup RK, Kurup PA. *Hypothalamic Digoxin, Cerebral Dominance and Brain Function in Health and Diseases*. New York: Nova Medical Books, 2009.