ADMINISTRATION OF SEROTONIN AND DOPAMINE PRECURSOR DRUGS AT SPECIFIC TIME INTERVAL INFLUENCES REPRODUCTIVE CONDITIONS IN DOMESTIC PIGEON, COLUMBA LIVIA

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ABSTRACT – Circadian serotonergic and dopaminergic activity is the basis of seasonal physiological/metabolic conditions. To test this hypothesis present study was designed in an avian species, domestic pigeon, Columba livia, which is monogamous and produces crop milk during brooding. 12 mature female pigeons were divided into two groups of 6 birds each. Group-I administered with two daily injections of normal saline and served as control. Group-II administered with injections of 5-HTP (5-Hydroxytryptophan, a serotonin precursor) at 8:00 AM and L-DOPA (L-Dihydroxyphenylalanine, a dopamine precursor) at 8:00 PM and served as 12 hr circadian phase relation of serotonergic and dopaminergic activity. The injections (5 mg 5-HTP and L-DOPA/100 gm body weight) were given for 10 days. Observations were made at 15 days post-treatment. Results indicate that the group of pigeon which was administered with 12 hr circadian phase relation of serotonergic and dopaminergic activity showed significantly decreased body, reproductive organs and crop gland weight and significantly lowered value of plasma estrogen and prolactin level in comparison to saline treated control group. Histologically crop gland of 5-HTP and L-DOPA treated birds showed inactive milk secreting activity as it had no milk secreting gland and no any proliferation in the inner lining of the crop. In contrast to the previous report in other avian species (12 hr circadian phase relation of serotonergic and dopaminergic activity is stimulatory for various metabolic and reproductive conditions), present study showed inverse response suggesting that circadian phase relationship of serotonergic and dopaminergic activities in the brain might be sex dependent and differ in different avian species in regulating various metabolic/reproductive phenomena.

Key words: Neurotransmitter, reproduction, pigeon, dopamine.