

Preface

Varying environmental factors in relation to light-dark and seasonal cycle may impose fluctuation in non-specific immune function (besides other physiological functions) and thereby in disease susceptibility of animals (especially ectotherms). The non-specific immune system consisting of mono- and poly-morphonuclear, phagocytes form the first line of host defense and play crucial role in survival of animals. Circadian and seasonal change in non-specific immune function and its regulation by interacting hormonal system is a research topic requiring much additional work.

A good deal of information is available on leucocyte profile and their reactivity in mammals, which are an important bio-model used for hematological pre-clinical biomedical studies. The interactions between leucocyte reactivity and hormones (particularly melatonin and steroids) are well defined in endothermic vertebrates, especially mammals. Intensive developments can be observed in studies on mammalian and avian species relating to seasonal cycle of reproduction regulated by melatonin hormone whose level itself depends upon day length/photoperiod. Recently much attention is being directed to ability of melatonin to modulate the immune function, aging, and disease processes. Immune cells are reported to possess the melatonin specific receptors and biosynthetic enzymes.

However, it is important to say that there is no report on seasonal variation in non specific immune responses in relation to melatonin and sex steroid in reptiles. Hence interest aroused to undertake the present problem in

an ophidian model, the fresh-water snake, *Natrix piscator*, with following objectives.

1. Circadian and seasonal rhythmicity in profile of leucocytes and its non specific immune reactivity.
2. Hormonal correlates (Melatonin and sex steroids) of leucocyte immune responses.

The present dissertation contains five chapters. The first chapter describes the effect of *in vivo* and *in vitro* melatonin on innate immune functions of blood leucocytes. Second and third chapter deal in seasonal and circadian variation in innate immune responses of blood leucocytes respectively while the effect of photoperiodic manipulation and testosterone on immune functions is presented in chapter 4 and 5 respectively.

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