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Temporal Changes Mediated by Sri Lankan Sponge *Haliclona (Soestella) sp* Crude Extract in *in vitro* Phagocytic Activity of Wistar Rats' Peritoneal Macrophages

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Abstract

Temporal changes in the production of secondary metabolites by marine organisms are fully understood. Of all marine organisms, marine sponges are ranked at the top of the hierarchy due to their ability to produce structurally novel natural secondary metabolites with bioactive properties. However, variations in the abundance of bioactive compounds produced by sponges may respond to physical constraints while the habitat spongesise, competition for space, or against fouling may also cause changes in sponge secondary chemistry. Many of these biotic or abiotic factors vary between months, seasons, and years resulting strong temporal patterns in secondary metabolites. The present study thus investigated temporal changes mediated by the crude extract of a Sri Lankan marine sponge species, *Haliclona (Soestella) sp*, on *in vitro* phagocytic activity of Wistar rat peritoneal macrophages (PM). Sponge samples were harvested from Unawatuna, Galle, Sri Lanka by scuba diving in 2013 and 2015, extracted with methanol/dichloromethane, followed by filtration through Whatman No 1 filter papers and rotary evaporation. The resultant crude extract of *Haliclona (Soestella) sp* (HSCE) was dissolved in 5% ethanol and tested for phagocytic capacity on Wistar rat PMs at 2000, 1000, 500, 100, 10 µg/ml concentrations by *ex vivo* Nitro Blue Tetrazolium assay (NBT). Absorbance was obtained as a measure of NBT dye reduction by PM cells and the phagocytic capacity of these cells was calculated. The previous results, the phagocytic activity of rat PMs evaluated *ex vivo* was significantly higher at HSCE doses of 10, 100 and 500 µg/ml (>1; P<0.01) than at 1,000 & 2,000 µg/ml doses (<1; P<0.05), indicative of higher stimulation of PM cells by lower doses of the HSCE extracted from sponges collected in 2013. However, a dose dependent increase in phagocytic activity by PM cells was observed by HSCE extracted from sponge samples collected in 2015 (P<0.05), indicative of the higher stimulation of PM cells by higher doses of the HSCE extracted from sponges collected in 2015. Therefore, it is evident that a temporal change had occurred in the secondary metabolites responsible for phagocytic activity produced by *Haliclona (Soestella) sp* within a periods of two years (from 2013 -2015).

Keywords: Temporal change, *Haliclona (Soestella) sp*, Phagocytic activity