

Protective Role of Phycobiliproteins in ROS-Associated Physiological Anomalies

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Abstract : Phycobiliproteins (PBPs) are light harvesting proteins showing very strong absorbance and fluorescence in the visible range of the solar spectrum. Phycoerythrin (PE) and phycocyanin (PC) are majorly found PBPs in the cyanobacteria and red algae. In the present study, we have investigated the reactive oxygen species (ROS)-averting capacity of purified PE and PC of cyanobacterial origin. Furthermore, the possibility - whether the ROS-averting potential of PBPs can be explored in the therapeutics of oxidative stress associated physiological anomalies including aging and neurodegenerative diseases. The nematode *Caenorhabditis elegans* has been used as model organism in this study. PE and PC treatment moderated normal aging and associated physiological functionalities like pharyngeal pumping and locomotion of *C. elegans*. Moreover, PE-treatment enhanced the stress (oxidative and heat) tolerance upon PE and PC treatment. Specifically, PE treatment was also noted to moderate the progression of Alzheimer's disease in transgenic *C. elegans* CL4176. However, PC-treatment curtailed the polyQ aggregation mediated proteotoxicity in *C. elegans* AM141 (Huntington disease model) under stressed (paraquat stress) as well as normal conditions. The effectiveness of PE and PC in expanding the lifespan of mutant *C. elegans* knockout for some up- (*daf-16*) and down- (*daf-2* and *age-1*) stream regulators of insulin/IGF-1 signalling (IIS) shows the independency of their effects from DAF-2-AGE-1-DAF-16 signalling pathway. In conclusion, the present report demonstrates the anti-aging and neuro-protective potential of cyanobacterial PE and PC.

Keywords : phycobiliproteins, aging, alzheimer, huntington, *C. elegans*

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