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Interaction between alpha-2-macroglobulin and phycocyanobilin – structural and physiological implications

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In this study, the interaction between phycocyanobilin (PCB)¹, a bioactive chromophore of blue-green algae *Spirulina's* phycobiliproteins, and alpha-2-macroglobulin (α 2M)², a universal anti-proteinase, was investigated under simulated physiological conditions using spectroscopic techniques and α 2M activity assay. Using spectrofluorimetric measurements, we found that α 2M binds PCB with a moderate affinity, with a binding constant of $6.3 \times 10^5 \text{ M}^{-1}$ at 25°C. The binding of PCB to α 2M does not cause any significant change in the secondary structure of the protein (circular dichroism measurements). Besides, PCB protects α 2M from structural oxidative alterations under AAPH-induced free radical overproduction. Further, PCB binding effectively preserves α 2M anti-proteinase activity. Since α 2M is involved in controlling the action of enzymes during the inflammatory process, the protection that PCB expresses could indirectly influence the intensity and direction of body response to impaired homeostasis, especially under oxidative stress.

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