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BIOSYNTHESIS AND PUTATIVE FUNCION OF PTERIDINE GLYCOSIDES IN CYANOBACTERIA

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Pteridine glycosides have various kinds of sugars attached to the side chain at C-6 of the pterin ring such as biopterin, 6-hydroxymethylpterin, and neopterin and are found in cyanobacteria, anaerobic photosynthetic bacteria *Chlorobium limicola* and *Chlorobium tepidum*, and a chemoautotrophic archaebacterium *Sulfolobus solfataricus*.In contrast to aglycosidic BH4, which is a well-known cofactor for aromatic amino acid hydroxylation and nitric oxide synthesis in higher animals, BH4-glucoside, including other pteridine glycosides, is produced in high cellular concentration and has no definite cellularfunction so far. Earlier studies postulated a role in electron transport in photosynthesis. A protective role against UV damage was suggested due to finding of the increased synthesis of biopterin-glucoside in a marine cyanobacterium *Oscillatoria*sp. upon exposure to UV-A irradiation. More recently, biopterin-glucoside was shown to stabilize phycocyanin under UV light. Tetrahydrobiopterin (BH4)-glucoside is a pteridine glycoside produced in *Synechococcus* sp. PCC 7942. BH4-glucoside is synthesized from BH4 and UDP-glucose by the enzyme UDP-glucose: BH4 -glucosyltransferase (BGluT). The encoding gene in *Synechococcus*sp. PCC 7942 was cloned after protein purification and subsequently disrupted. The BGluT mutant produced onlyaglycosidic BH4 in 8.3% of wild type with a significantly decreased growth rate (approx. a half of the wild type), suggesting that aglycosidic BH4 plays a role in light harvesting and utilization process under the visible light growthcondition. Proteomics analysis of the BgluT mutant revealed downregulated production of 33K phycobilin linker protein, further suggesting a possible role in photoprotection.