Title:	Polyhydroxyalkanoate synthase (PhaC): The key enzyme for biopolyester synthesis
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Abstract:	Polyhydroxyalkanoates (PHAs) are considered good candidates in replacing commercial petrochemical plastics in certain applications like single-use packaging since they are biodegradable, biocompatible and share similar properties with conventional plastics. PHA synthase (PhaC) is the key enzyme in PHA biosynthesis. There are four classes of PhaC, namely, class I, class II, class III and class IV, each with their distinct characteristics. To date, there are two PhaCs with successfully solved catalytic domain structures. They are PhaC from C. necator (PhaCCn-CAT) (Ser201–Ala589) and PhaC from Chromobacterium sp. USM2 (PhaCCs-CAT) (Phe175–Asn567). Generally, the structure of PhaC consists of an N-terminal domain and a C-terminal catalytic domain. The N-terminal domain is flexible and has not been successfully visualized in any existing structures of PhaC. It is suggested to affect the dimerization and stability of the PhaC dimer, enzymatic activity, substrate specificity, molecular weight of PHA produced, expression of PhaC, and its ability to bind to PHA granules and PHA-related proteins. The C-terminal catalytic domain contains the cap subdomain, substrate entrance channel, active site, and product egress tunnel.
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