

# Gene *sll0033* from *Synechocystis* 6803 Encodes a Carotene Isomerase Involved in the Biosynthesis of all-*E* Lycopene

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The function of gene *sll0033* from *Synechocystis* 6803 which is homologous to the bacterial *crtI*-type phytoene desaturase genes was elucidated as a novel carotene isomerase. *Escherichia coli* transformed with all genes necessary for the formation of  $\zeta$ -carotene and expressing a  $\zeta$ -carotene desaturase synthesized the positional isomer prolycopene (7,9,7',9'*Z* lycopene) which cannot be cyclized in the subsequent reactions to  $\alpha$ - and  $\beta$ -carotene. Upon cotransformation with *sll0033*, the formation of all-*E* lycopene is mediated instead.