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RECENT ADVANCES IN MOLECULAR REGULATION OF CYSTEINE BIOSYNTHESIS IN PLANTS

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Cysteine biosynthesis plays a crucial role in sulfate assimilation in plant cells. Cysteine is the first organic precursor for the formation of sulfur-containing metabolites in plants such as methionineand glutathione. In plants, cysteine is formed by the conjugation pathway of reductive metabolism of sulfate ion and activation of serine.

Two regulatory mechanisms for cysteine formation have been clarified by our recent studies ; one at the level of enzyme activity and the other at the transcriptional level. The enzyme activity of serine acetyltransferase catalyzing the formation of O-acetylserine from serine and acetyl-CoA is inhibited by L-cysteineat the concentration of less 10μM. This inhibition was observed in the isoforms from watermelon, spinach and *Arabidopsis thaliana*. However, two isozymes from *A. thaliana* were insensitive to L-cysteine, suggesting different regulation among isozymes. A region responsible for the feed-nack regularion was located in the C-terminal portion of serine acetyltransferase protein. Northern jybtidization analysis of sulfate starved plants indicated that the steady-atate mRNA level of an isoform of sulfate transpoter (AST68) incereased specifically in roots up to~9 folds by sulfate starvation. Among all the structural genes encoding the proteins for sulfate assimilation, sulfate transporter(AST68), APS reductase(APR1) and serine acetyltransferase(SAT1) are inducible by sulfate starvation in *A. thaliana*. The sulfate transporter(AST68) exhibited the most intensive and specific response in roots. *In situ* hybridization expeiments indicated that AST68 is expressed in the central cylinder of roots. These results indicating that AST68 plays a central role in the transcriptional regulation of sulfate assimilation in plants.