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## Structural and Functional Differentiation of Bundle Sheath and Mesophyll Cells in the Lamina Joint of Rice Compared with that in the Corresponding Region of the Liguleless Genotype

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**Abstract:** The structural and functional characterization of the blade-sheath boundary region of a rice cultivar T65 and its near-isogenic line T65lg were examined by light and electron microscopy and *in situ* hybridization. Starch accumulation in bundle sheath cells was compared between the lamina joint of T65 and the corresponding region of T65lg and also between the lamina joint and the leaf blade. In the lamina joint of T65, starch grains were predominantly accumulated in bundle sheath cells, and the starch-containing chloroplasts within these cells were spherical in shape. On the other hand, in the blade-sheath transition region of T65lg, little starch accumulation was observed and the chloroplasts were oval in both mesophyll and bundle sheath cells. Furthermore, photosynthesis-related genes, *rbcS* and *cab*, were expressed in mesophyll cells within the blade-sheath transition region of T65lg as in the leaf blade and sheath, while no expression of these genes was found within the lamina joint of T65. These facts indicate that T65lg can not develop the lamina joint from either structural or functional aspect. The present results suggest that the control mechanism of starch accumulation in bundle sheath chloroplasts in the lamina joint differs from that in leaf blade in rice.

**Keywords:** [Blade-sheath boundary region](#), [Bundle sheath](#), [C<sub>3</sub> plant](#), [Lamina joint](#),



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