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Structural Studies on Carboxysomes and their Components. Cheryl A. Kerfeld, Michael R. Sawaya, Janel Laidman and Todd O. Yeates, Molecular Biology Institute, UCLA, Box 951570 Los Angeles, CA 90095-1570.

Carboxysomes are microcompartments found in many chemoautotrophic bacteria and in all cyanobacteria. These polyhedral bodies contain Ribulose-1,5-bisphosphate carboxylase (RuBisCo). Carboxysomes appear to optimize the activity of RuBisCo and so they play a critical role in enhancing carbon fixation. The carboxysome shell is composed of several highly homologous ~10 kDa proteins. It appears that the carboxysome shell is built mainly from these small shell proteins; our preliminary results show that closed shells can be formed exclusively from these subunits. In order to understand principles of carboxysome assembly and function, we have undertaken the first structural analysis of carboxysome and its isolated component proteins and enzymes. Crystals have been obtained of five different carboxysome proteins, two of which diffract to high resolution. Progress in structure determination will be reported.