The carboxysome of *Thiobacillus neapolitanus*

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In 1981 Beudeker and Kuenen showed the presence of all enzymes of the Calvin cycle in carboxysomes of *Thiobacillus neapolitanus*. It was suggested that carboxysomes function as carbon dioxide-fixing organelles in the prokaryotic cell.

The aim of the present study is to gain insight into the structure and function of the carboxysomes. An improved isolation and purification procedure has been developed, which leads to the isolation of carboxysomes which are not contaminated with cytoplasmic or cell-envelope components. These carboxysomes contain the enzymes ribulose-1, 5-bisphosphate carboxylase, 3-phosphoglycerate kinase, glyceraldehyde-3-phosphate dehydrogenase and malate dehydrogenase with specific activities which are higher than the activities found in membrane vesicles or cell extracts. The activity of other enzymes has not yet been tested.

Crossed immunoelectrophoresis of carboxysomes revealed at least 21 immunoprecipitates. With isolated fractions of carboxysome "coat" two or three immunoprecipitates are found. These appear to be glycoproteins. (Phospho)lipids could not be detected in the carboxysomes. Structural analyses of carboxysomes with electron microscopy indicate that carboxysomes approximate an icosahedron; the angular points represent probably one, the planes another protein.

Carboxysomes contain DNA. The role and significance of this DNA is currently investigated.