

Sugar sensing of symbiotic *Chlorella* isolated from Japanese *Paramecium bursaria*

Yutaka KATO and Nobutaka IMAMURA (Department of Bioscience and Biotechnology,
Ritsumeikan Univ.)

We studied the effect of glucose on amino acid transport of symbiont F36-ZK from Japanese *Paramecium bursaria* F36. The algal Ser uptake was increased in the presence of glucose. Uptakes of Ala and Gln, but not Arg, were also accelerated by the sugar. These responsive amino acids are transported via a general amino acid transport system, indicating an association of the transporter and the response. In kinetic analysis of Ser uptake, a 2-fold V_{max} value was measured in the presence of glucose, suggesting that the amount of transporter was increased. However, cells in which protein synthesis was inhibited by cycloheximide also showed the response to glucose. The response became stronger as external pH was increased from 5.5 to 8.0, and preincubation with glucose for more than 10 min was needed for the maximum effect. As a low concentration of glucose also accelerated Ser uptake, and glucose uptake was not detectable, these results indicated that the response to glucose occurred via a signaling pathway. We also examined the effect of glucose-related compounds. Glucose dimers, disaccharides, accelerated Ser uptake in the same way as glucose. Assays using monosaccharides revealed that stereochemistry at carbon 2, and hydroxyl groups at carbons 3 and 6 are important for the response.