

Photosynthesis is a light-driven process performed by plants that enables life of all organisms on Earth. It takes place in chloroplasts and relies on the conversion of light into chemical energy. During photosynthesis oxygen is released from water, while carbon dioxide is converted into carbohydrates. Solar radiation absorbed by chlorophyll molecules is used to obtain high-energy electrons. These electrons, transferred by subsequent carriers localized in thylakoid membranes, are used to create assimilation power in the form of NADPH and ATP. These compounds, formed during so called light-phase are consumed during CO₂ assimilation and conversion into organic compounds in Calvin cycle.

In light reactions of photosynthesis two pigment-protein complexes are engaged – photosystem I and II (PSI and PSII). During light-driven electron transport, additional carriers are involved, e.g. plastoquinone. This molecule showing membrane mobility, can accept and release reversibly electrons and protons. However, due to its large size, mobility of the plastoquinone molecule is rather low due to its long side-chain. It was already shown in model systems, that the mobility of plastoquinone molecule can be increased if the side-chain is shortened. Therefore, we plan to obtain genetically modified plants, where the plastoquinone side-chain will be shortened. Next we will check if this will affect photosynthesis rate. Research of this kind are of huge practical importance for crop plants productivity