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Flux of precursors through the iron and magnesium branches of the tetrapyrrole pathway in isolated pea chloroplasts

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The flux between the chlorophyll and heme branches of tetrapyrrole synthesis in pea (*Pisum sativum* L.) chloroplasts was estimated. The chloroplasts were administered exogenous δ-aminolevulinic acid (ALA) and heme synthesis was quantitated by incorporation of ^{14}C-ALA. Flux through the chlorophyll branch was estimated by measuring levels of the first committed intermediate in the pathway, Mg-protoporphyrin IX (Mg-Proto). The newly synthesized heme was broken down by fifty percent in ten min and heme breakdown was specific: neither endogenous heme nor chlorophyll, nor newly synthesized Mg-protoporphyrin IX were broken down. In the presence of ATP, Mg-Proto accumulation was ten-fold greater than heme accumulation whereas heme synthesis was suppressed by 68%. The total amount of Mg-Proto plus heme in the presence of ATP was 80% higher than the protoporphyrin + heme content in the absence of ATP. Therefore ATP appears to play a regulatory role, which is overall stimulation of total porphyrin pool (Proto + Mg-Proto + heme) accumulation and inhibition of heme synthesis.

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Cellulose Production in Roots of Three Cellulose-less Mutants and Their Corresponding Normal Strains of Barley (*Hordenum vulgare* L.)

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Calluses and Suspension-cultured cells derived from root segments of three isogenic cellulose-less mutants of barley did not exhibit the cellulose-less characteristic (Yeo et al., 1995). To compare the cellulose production between *in vivo* cultivation and *in vitro* culture, the middle parts of root of the 2-day-old seedlings was excised. The middle parts was fractionated into MeOH, HW (hot water), TFA (trifluoroacetic acid), and cellulose fraction and total sugar contents of each fraction was measured by phenol-sulfuric acid method. Even though the range of cellulose percentages to total sugar contents in above six strains was 9.9 (14.1--24.0)%, the differences of cellulose contents between normal and mutant strains were neither conspicuous nor consistent, indicating that primary root cells do not favor the normal production of cellulose in the stem of normal strains.