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Meeting abstract

Diploid parthenogenesis and 'early embryo' development in Norway spruce cell suspensions

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In diploid parthenogenesis, 'proembryos' developed from binucleate egg-equivalents containing an egg nucleus and an apoptotic ventral canal nucleus. As the axial tier of 'early embryos' formed, the cell regulatory proteins in proembryonal cells were ubiquitinated and turned over as suspensors differentiated. Axial tier formation was blocked at high levels of chlorsulfuron, an inhibitor of acetolactate synthase. This enzyme is required for the biosynthesis of branched-chain amino acids, which are especially abundant in ubiquitin. The block of acetolactate synthase led to the accumulation of free ∀-amino-n-butyrate. The overall behavior of branched-chain amino acids revealed rigid and linear relations over all chlorsulfuron levels. The proliferating cell nuclear antigen (PCNA), required for DNA synthesis, was detected in rapidly cycling proembryonal cells. PCNA appeared to serve as a factor maintaining the cell replication typical of rapidly growing early embryos. Less than 0.01% of nuclei reacted with epitopes to anti-p53 and anti-p21 that are commonly associated with cell cycle arrest and DNA damage. The cleavage sites of early embryos involved apoptosis and contributed to their multiplication. Chlorsulfuron contributed to aborted axial tier development due to disrupted patterns for the ubiquitination of cell regulatory proteins as revealed by changes in the soluble amino acids.