Poster: Cell walls

Abs # P18002: Live imaging and quantification of cellulose biosynthesis

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A liquid crystal polarisation microscope (LC-Polscope) can measure birefringence of polymers quantitatively. We have set up an LC-Polscope and are able to measure single microtubules as has been shown before by Oldenbourg et al. (Biophys. J. 74: 645-654, 1998). We are using this microscope to measure the rate of synthesis of cellulose microfibrils in vitro, on living protoplasts and in the bands of xylem cells from Zinnia suspension culture. The production of cellulose microfibrils in vitro is being performed based on techniques described by Bulone et al. (J. Biol. Chem. 277,36931-36939, 2002) for which we use tobacco BY-2 suspension cells. As a standard for quantification of cellulose microfibril production, we calibrate using correlative microscopy in which the same single cellulose microfibrils, produced in vitro, or extracted from cells, are being visualised in the electron microscope prior to, or subsequently to, measurement in the LC-Polscope. Several controls are being performed, such as depolymerisation of microtubules and extraction of cell wall matrix polysaccharides.