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Functional Plant Biology

Contents

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Cover illustration: Flow of carbon nutrients to developing pollen in the pollen sac of anthers. The diagram illustrates a section of an anther and the flow of sugars to developing pollen. In the dermis, symplastic (double-headed arrow) and active transport of sucrose (red arrow) occurs and within the tapetal layer the three broad classes of invertases that can break sucrose down to glucose and fructose, if they are expressed, are shown. CIN is the cytoplasmic invertase, VIN is the vacuolar invertase and IVR1 is the cell wall invertase. In the pollen sac layer the developing pollen (tetrad and uni-nuclear stages) from wheat are shown as acetocarmine-stained cells (lower left side of panel, photograph provided by R. Dolferus, CSIRO) and DAPI-stained fluorescent images (lower right side of panel, photograph provided by B. Dell, Murdoch University). The network involved in maintaining the sugars at an optimum level includes the interactions of a protein inhibitor with the cell wall invertase to moderate the breakdown of sucrose to glucose and fructose. The diagram was designed by H. Webster (PhD thesis, Murdoch University).