Patterns of secondary metabolite accumulation in various depository vacuoles

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Sequestered secondary metabolite phenolic pools were located in vacuoles of epidermal and hypodermal cells in *Parthrnocissus* aerial root tissues. The phenolics were constituents of many of the aerial root component tissues, but the distribution of these deposits varied with development. The deposits appeared most concentrated in the superficial cell layer adjacent to the epidermis, with least density in layers closer to the cortex. Ultrastructural studies revealed that deposits were restricted to the vacuoles, taking different forms, mainly associated with the tonoplast. They appeared to accumulate on the inner periphery adjacent to the tonoplast or in the center of the organelle, possibly next to the vacuolar invaginations. Large vacuoles were almost completely filled with the phenolics. Electron micrographs clearly showed deposits on the inner side of the vacuolar membrane, with cellular organelles between deposits and the plasma membrane. When viewed at very high magnification, the deposits appeared amorphous with strands of the phenoics connected to the outer edge and projecting out into the vacuole. The types of deposits varied from those in a mesh-like network, extending across the vacuole, to globular deposits either free in the vacuole or attached to the tonoplast. The deposits accumulated continuously until they filled the entire volume of each vacuole. Some large depository vacuoles were completely filled with phenolics, which had a corrugated appearance on the sectioned surface. The pattern and potential role of the deposits will be discussed.