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IS THE REDOX ACTIVITY OF PLASMA MEMBRANE CYTOCHROME AIR12 INVOLVED IN CELL SEPARATION EVENTS?

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Redox, plasma membrane, cell wall, auxin

AIR12 is the major plasma membrane cytochrome b belonging to a new family of ascorbate-reducible cytochromes b specific to flowering plants. Based on GFP-localization experiments and sequence analysis, AIR12 is suggested to be bound *in vivo* to the external side of the plasma membrane by means of a GPI-anchor. Moreover, AIR12 has been found associated with lipid rafts both in Medicago and Arabidopsis.

Arabidopsis AIR12 was heterologously expressed in *Pichia pastoris* and shown to be a high-potential cytochrome b with a symmetrical α-band at 560 nm. Ascorbate, superoxide and nafto-hydroquinones are all potential reductants of AIR12, whereas monodehydroascorbate works as potential electron acceptors. Although oxygen is not an efficient electron acceptor for AIR12, the *in vitro* characterization of AIR12 is hindered by the rapid oxidation of reduced AIR12 in the presence of oxygen.

Purified and permeabilized plasma membranes vesicles additioned with NADH, menadione e and FeEDTA produce superoxide and hydroxyl radicals that can be detected by EPR. We have found that further addition of recombinant AIR12 causes an increase in the production of both radicals, suggesting a pro-oxidant role of the protein under these conditions.

Arabidopsis lines transformed with the AIR12 promoter fused to the GUS or GFP genes show localized expression at sites where cell separation events occur (e.g. lateral root caps, root epidermis at site of lateral root emergence, micropylar endosperm during germination, anthers and floral organ abscission zones, hydatodes) as well as in the vascular bundles of mature leaves and trichomes support cells. Exogenously applied auxins boost reporter gene expression in the entire roots while ABA enhances expression specifically at the root tip. From available data, a role of AIR12 in cell wall modification processes is proposed, possibly involving its pro-oxidant activity.