

LETTER TO THE EDITOR

- Pawlowski, K., and Bisseling, T.** (1996). Rhizobial and actinorhizal symbioses: What are the shared features? *Plant Cell* **8**, 1899–1913.
- Penmetsa, R.V., and Cook, D.R.** (1997). A legume ethylene insensitive mutant hyperinfected by its rhizobial symbiont. *Science* **275**, 527–530.
- Pillai, S., Funke, R.P., and Gresshoff, P.M.** (1996). Construction of YAC and BAC clones from the model legume *Lotus japonicus*. *Symbiosis* **21**, 149–164.
- Prosperi, J.M.** (1993). Selection of annual medics for French Mediterranean regions. In *Workshop on Introducing the Ley Farming System in the Mediterranean Basin*, S. Christiansen, L. Materon, M. Falcinelli, and P. Cocks, eds (Aleppo, Syria: International Center for Agricultural Research in the Dry Areas), pp. 173–191.
- Sagan, M., Morandi, D., Tarengi, E., and Duc, G.** (1995). Selection of nodulation and mycorrhizal mutants in the model plant *Medicago truncatula* (Gaertn.) after γ -ray mutagenesis. *Plant Sci.* **111**, 63–71.
- Scheres, B., McKhann, H.I., and van den Berg, C.** (1996). Roots redefined: Anatomical and genetic analysis of root development. *Plant Physiol.* **111**, 959–964.
- Trieu, A.T., and Harrison, M.J.** (1996). Rapid transformation of *Medicago truncatula*: Regeneration via shoot organogenesis. *Plant Cell Rep.* **16**, 6–11.
- Utrup, L.J., Cary, A.J., and Norris, J.H.** (1993). Five nodulation mutants of white sweet clover (*Mellilotus alba* Desr.) exhibit distinct phenotypes blocked at root hair curling, infection thread development, and nodule organogenesis. *Plant Physiol.* **103**, 925–932.
- van de Sande, K., Pawlowski, K., Czaja, I., Wieneke, U., Schell, J., Schmidt, J., Walden, R., Matvienko, M., Wellink, J., van Kammen, A., Franssen, H., and Bisseling, T.** (1996). Modification of phytohormone response by a peptide encoded by *ENOD40* of legumes and a nonlegume. *Science* **273**, 370–373.
- Vasse, J., de Billy, F., and Truchet, G.** (1993). Abortion of infection during the *Rhizobium melliloti*-alfalfa symbiotic interaction is accompanied by a hypersensitive reaction. *Plant J.* **4**, 555–566.

Back to the Walls

In our report of the second Keystone Symposium on "The Extracellular Matrix of Plants: Molecular, Cellular and Developmental Biology" (Carpita et al., 1996), we concluded with a section discussing the role of reactive oxygen species (ROS) generated in the cell wall. The work mentioned in the penultimate paragraph (pp. 1461–1462) was attributed solely to Chris Lamb (Salk Institute), whereas a significant amount of this work was actually that of Paul Bolwell and his colleagues at the University of London.

The transient appearance of ROS in the cell wall and the nature of the links between the oxidative burst and initial

elicitor recognition events were indeed discussed by Lamb (see Lamb and Dixon, 1997, for a review). The oxidative burst occurs very rapidly—within 2 to 5 min after reception of the elicitor—which places it proximal to the receptor in the signal transduction chain. NADPH oxidase has been suggested to be a link in this chain because it is an important component of the analogous defense-related oxidative burst in phagocytes. Inhibitor studies and the recent cloning of plant homologs of one subunit of the mammalian enzyme support this view.

However, it was Bolwell's group who found that NADPH levels remained unchanged during the oxidative burst in

French bean cells, and it is Bolwell and his colleagues who have emphasized that the nature of the reductant used during the production of ROS in the cell wall has yet to be established (see Bolwell, 1996, for a review).

Wall alkalization often accompanies or precedes ROS production, and Bolwell's group has also identified two peroxidases with pH optima >7 that could participate in the production of H_2O_2 without significant accumulation of superoxide and other ROS. Taken together, these studies demonstrate that the spatial organization of the reductant, the identity of the peroxidase, and other elements of the signal transduction

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pathway leading to the production of ROS in plant cell walls (e.g., the receptor for the elicitor) remain to be resolved.

We apologize to Drs. Bolwell and Lamb for this oversight and for any confusion it may have caused.

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REFERENCES

- Bolwell, G.P.** (1996). The origin of the oxidative burst in plants. *Biochem. Soc. Trans.* **24**, 438-442.
- Carpita, N., McCann, M., and Griffing, L.R.** (1996). The plant extracellular matrix: News from the cell's frontier. *Plant Cell* **8**, 1451-1463.
- Lamb, C., and Dixon, R.A.** (1997). The oxidative burst in plant disease resistance. *Annu. Rev. Plant Physiol. Plant Mol. Biol.* **48**, 251-275.