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Salicylic acid induces H_2O_2 production and endochitinase gene expression but not ethylene biosynthesis in *Castanea sativa in vitro* model system

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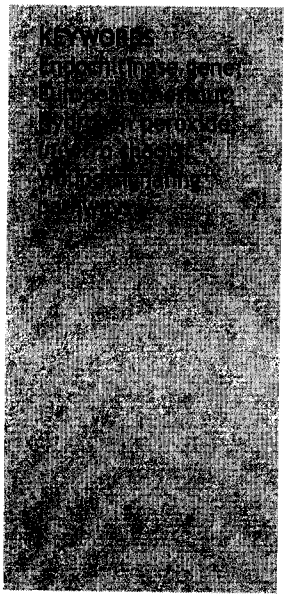

Summary

Salicylic acid (SA), ethylene (ET), and wounding are all known to influence plant defense response. Experiments attempting to determine SA's relation to ET biosynthesis and defense gene expression have shown conflicting results. To confront this, we developed an *in vitro* model system to investigate how SA affects ET biosynthesis, hydrogen peroxide (H_2O_2) production and endochitinase gene expression in the European chestnut. ET measurements of *in vitro* shoots indicated a critical time point for SA exogenous application, enabling us to study its effects independent of ET. In addition, ET measurements demonstrated that its own increased biosynthesis was a response to wounding but not to SA treatment. Application of the ET biosynthesis inhibitor, aminoethoxyvinylglycine (AVG), on wounded and SA-treated shoots blocked wounding-induced ET production. Interestingly, SA inhibited ET production, but to a lesser extent than AVG. Additionally, SA also induced the accumulation of endochitinase transcript level. Likewise, a sensitive tissue-print assay showed that SA further increased the level of H_2O_2. Yet, SA-induced endochitinase gene expression and SA-enhanced H_2O_2 production levels were independent of ET. The cumulative results indicate that SA acts as an inducer of endochitinase *PR* gene expression and of H_2O_2 oxidative burst. This suggests that SA is a component of the signal transduction pathway leading to defense against pathogens in chestnut. Further, the model system developed for this

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