

SECONDARY SIGNALS

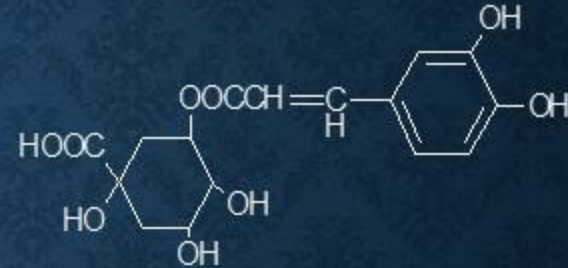
- Ca^{+2} , required for subsequent steps
 - May mediate phosphorylation-dephos. events involved in transcriptional or post-transcriptional gene regulation (there are a number of genes whose transcription increases, and some decrease)
- Some defense genes also induced by blue-UV light or other stresses

HOW ARE PHYTOALEXINS FORMED?

The “-noids”

- Shikimic acid pathway (phenylpropanoids)

- Hydroxycinnamic acids
- Coumarins
- Hydroxybenzoic acids



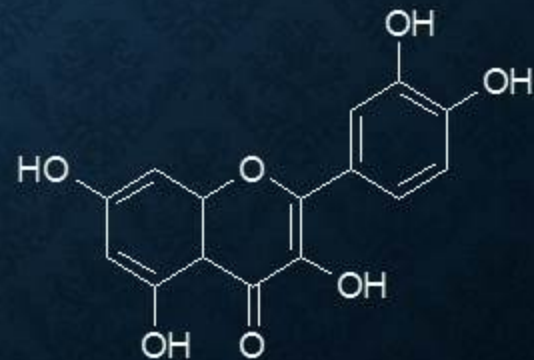
- Mevalonic acid pathway (Isoprenoids)

- Carotenoids
- Terpenoids



- Combination of Pathways Shikimic-Polymalonic)

- Flavonoids and anthocyanins



SIGNALING CASCADE FOR DEFENSE RESPONSES

- Molecular nature of elicitors:
- Cell wall proteins (e.g., Harpin)
- Intracellular proteins (defined genetically in a bacterium by cloning avirulent loci)
- Peptide derived from a larger protein (from a fungus)
- Heptaglucan (small oligosaccharide)