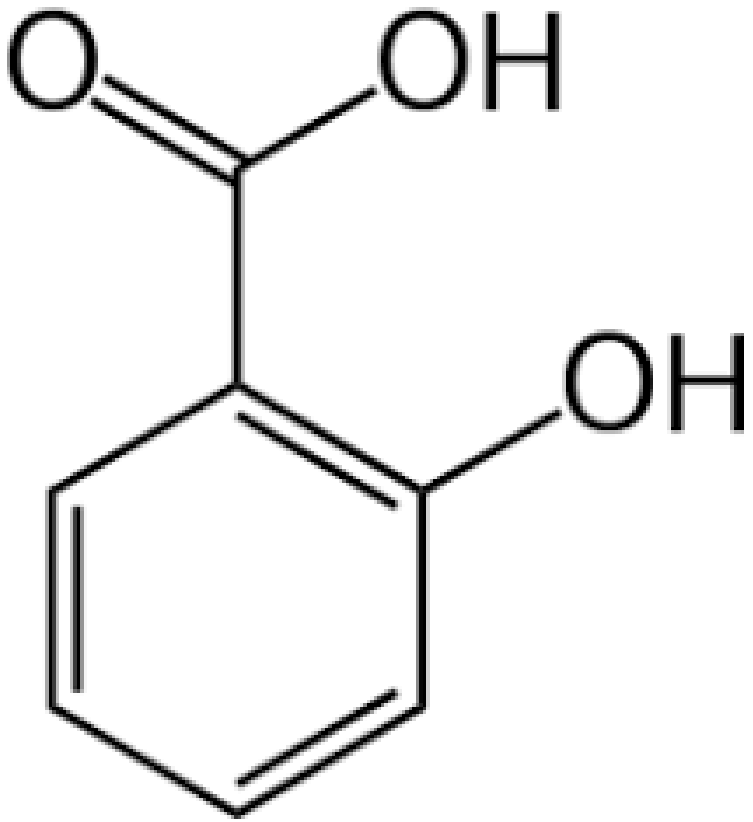
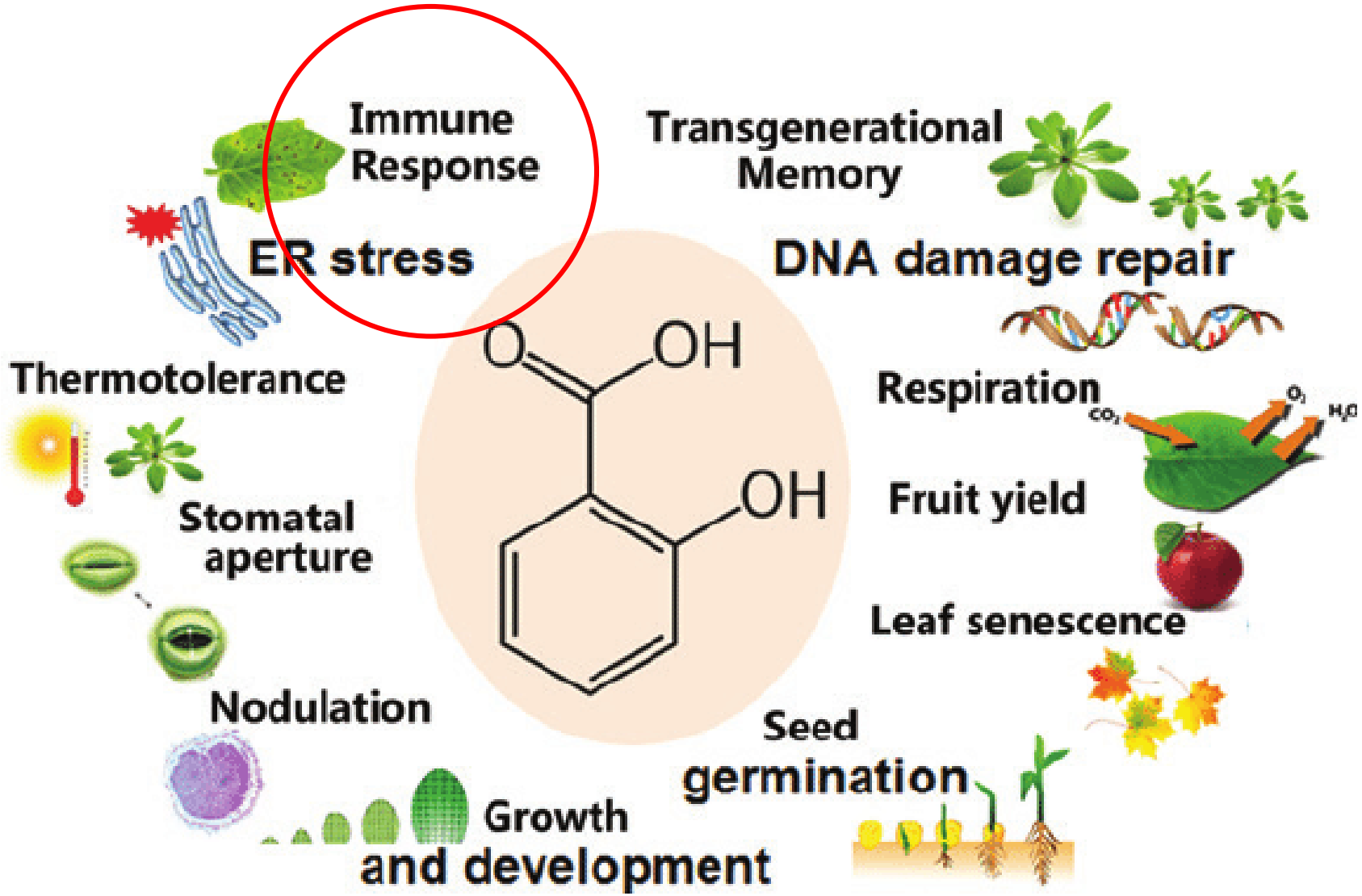
Salicylic acid (SA)



Function of SA



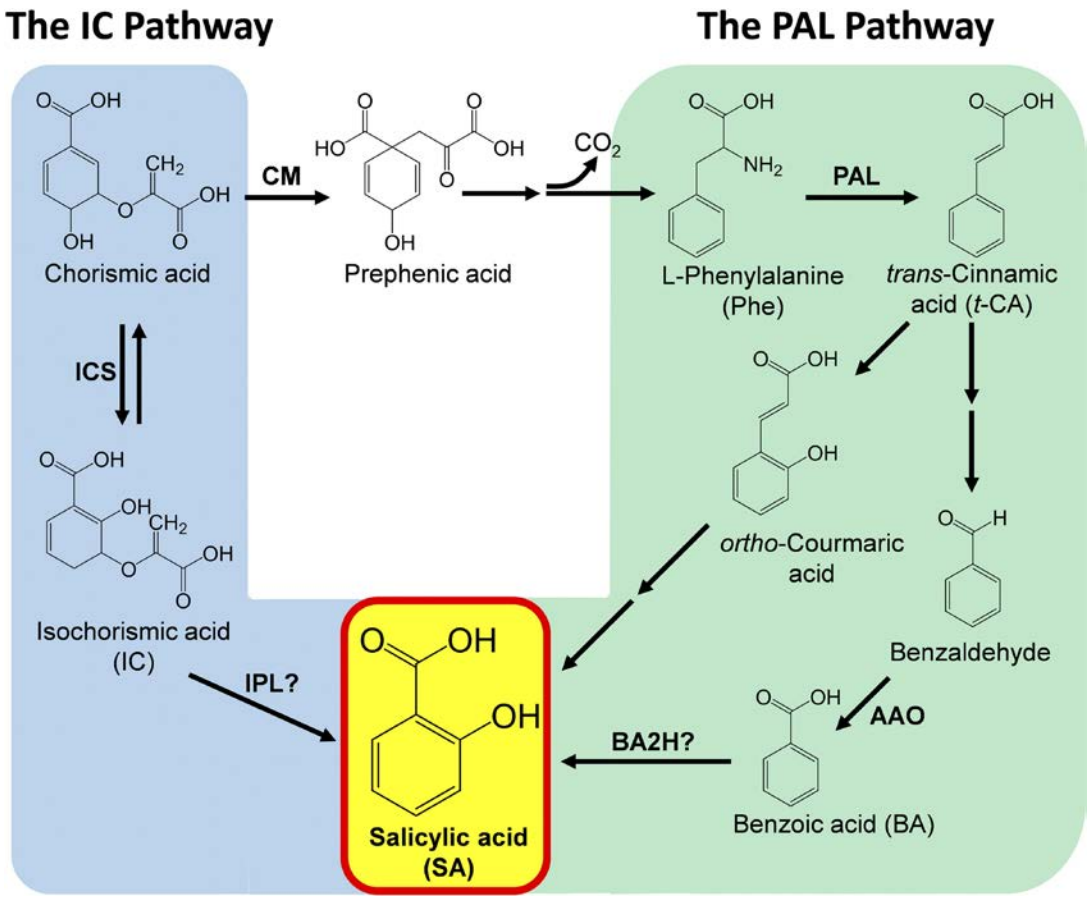
SA overproducer is resistant against *Pseudomonas*

wild-type SA overproducer

Two SA biosynthesis pathways

plastids

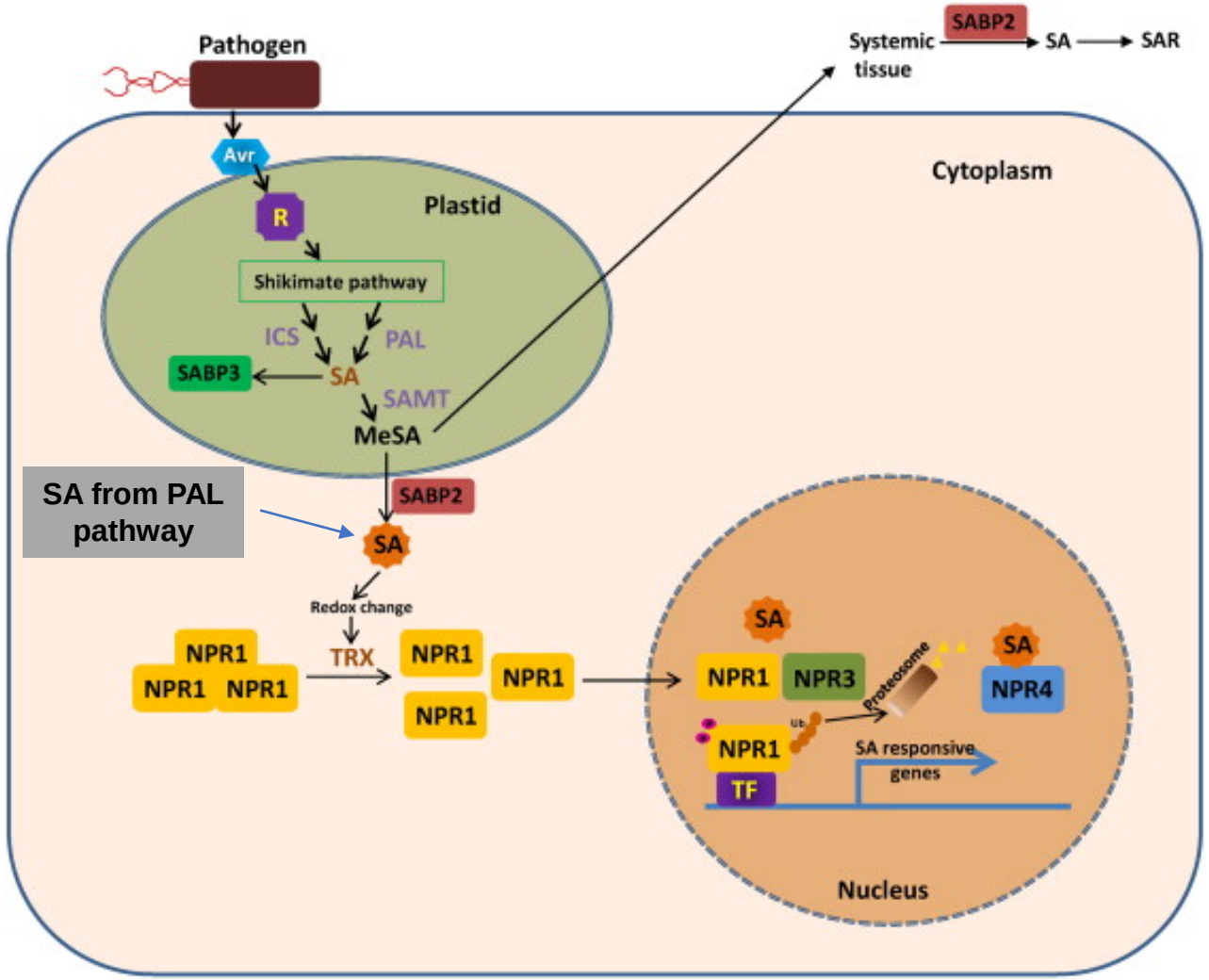
cytoplasm



Two SA biosynthetic pathways: the phenylalanine ammonia-lyase and the isochorismate pathway.

AAO = aldehyde oxidase, BA2H = benzoic acid 2-hydroxylase; CM = chorismate mutase; ICS = isochorismate synthase; IPL = isochorismate pyruvate lyase.

SA signaling



SA from cytoplasma or plastids

“

Redox change

“

Monomerisation of NPR1 receptor

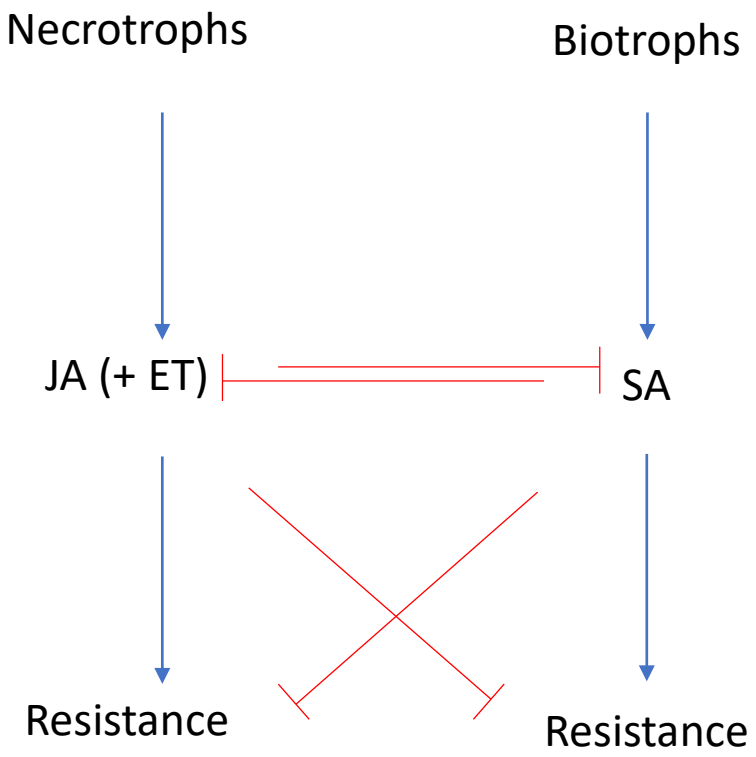
“

Monomer migrates to nucleus

“

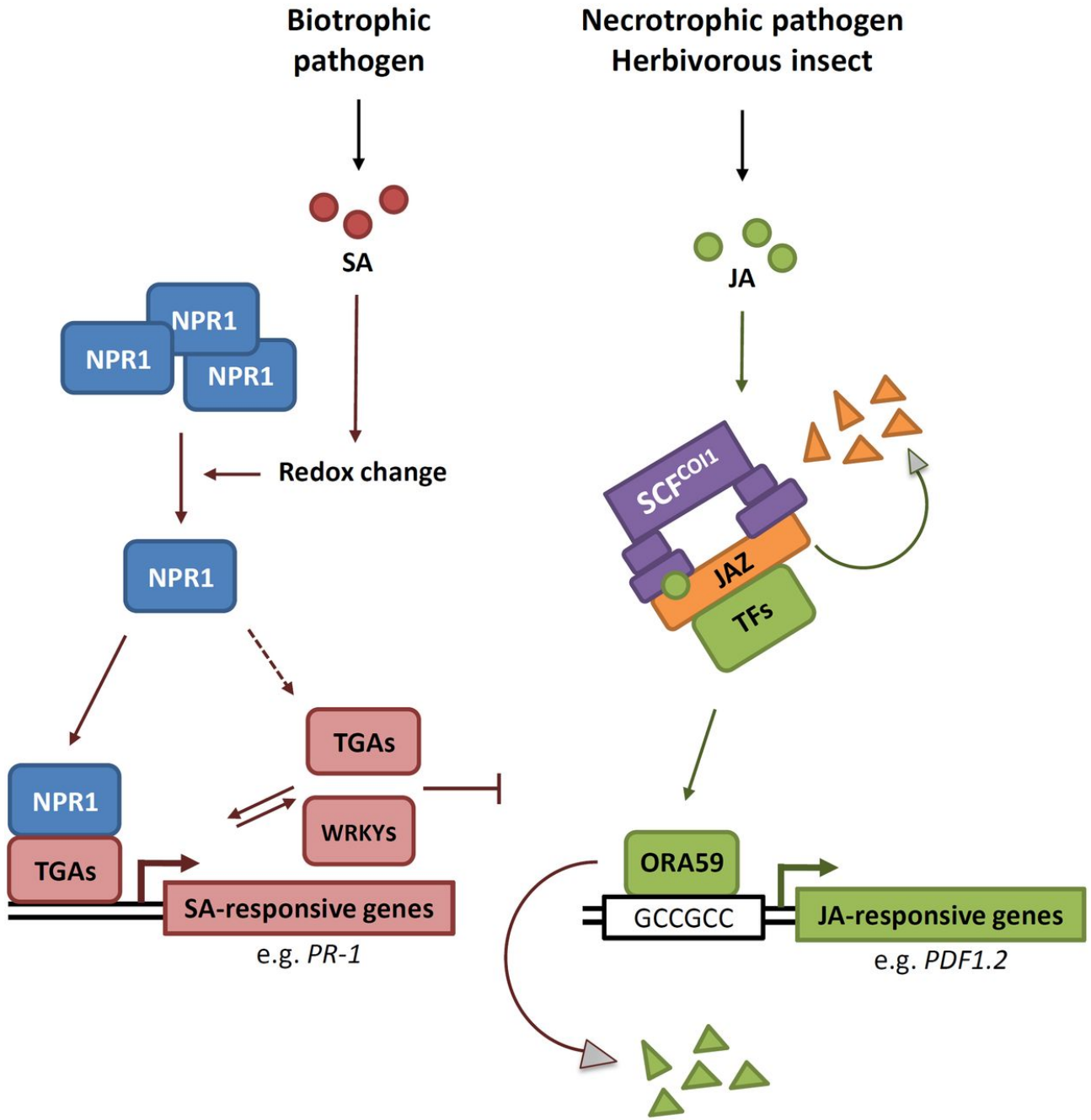
After complex formation, activation of SA-responsive genes (*PR-1*)

SA induces defense against biotrophs

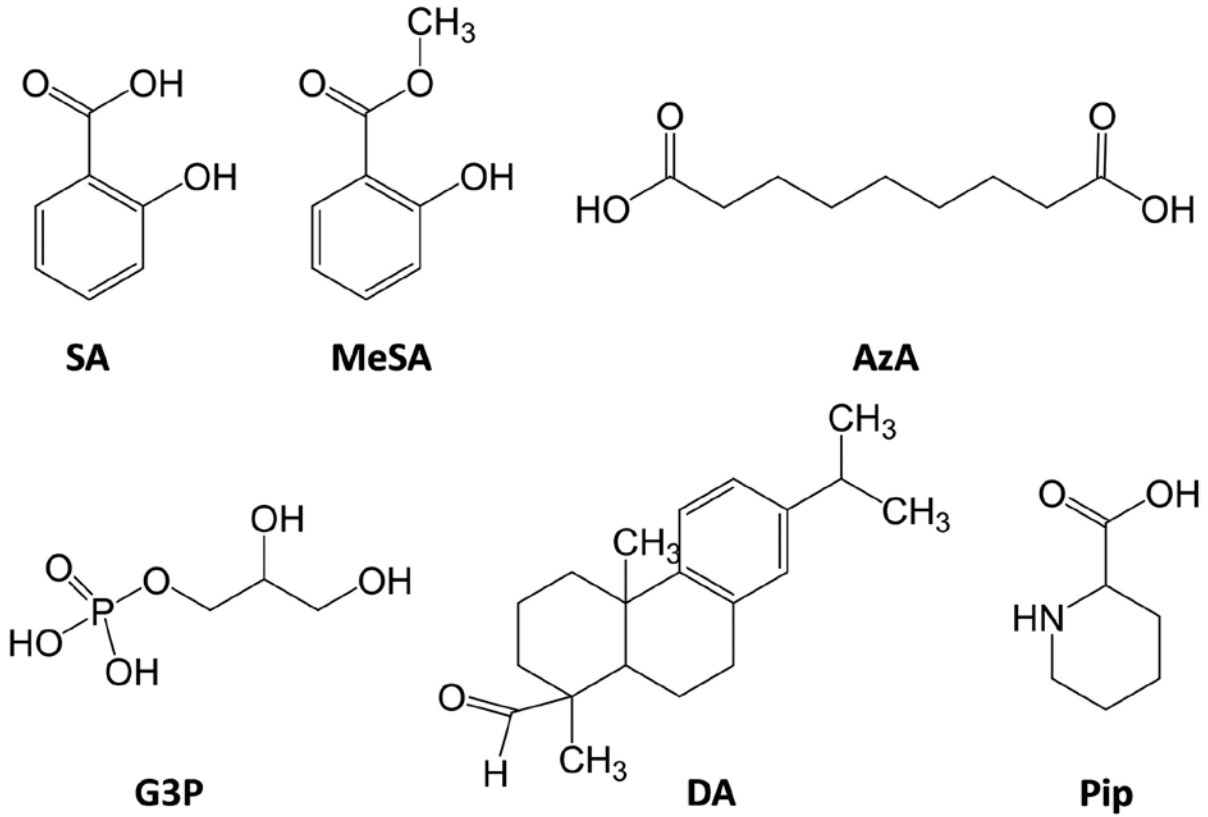


Crosstalk: hormone accumulation

Crosstalk: hormone signaling


Biotrophic pathogen
Necrotrophic pathogen
Herbivorous insect
SA
JA
NPR1
NPR1
NPR1
Redox change
NPR1
SCFCOI1
JAZ
TFs
TGAs
NPR1
WRKYs
TGAs
SA-responsive genes
e.g. PR-1
ORA59
GCCGCC
JA-responsive genes
e.g. PDF1.2

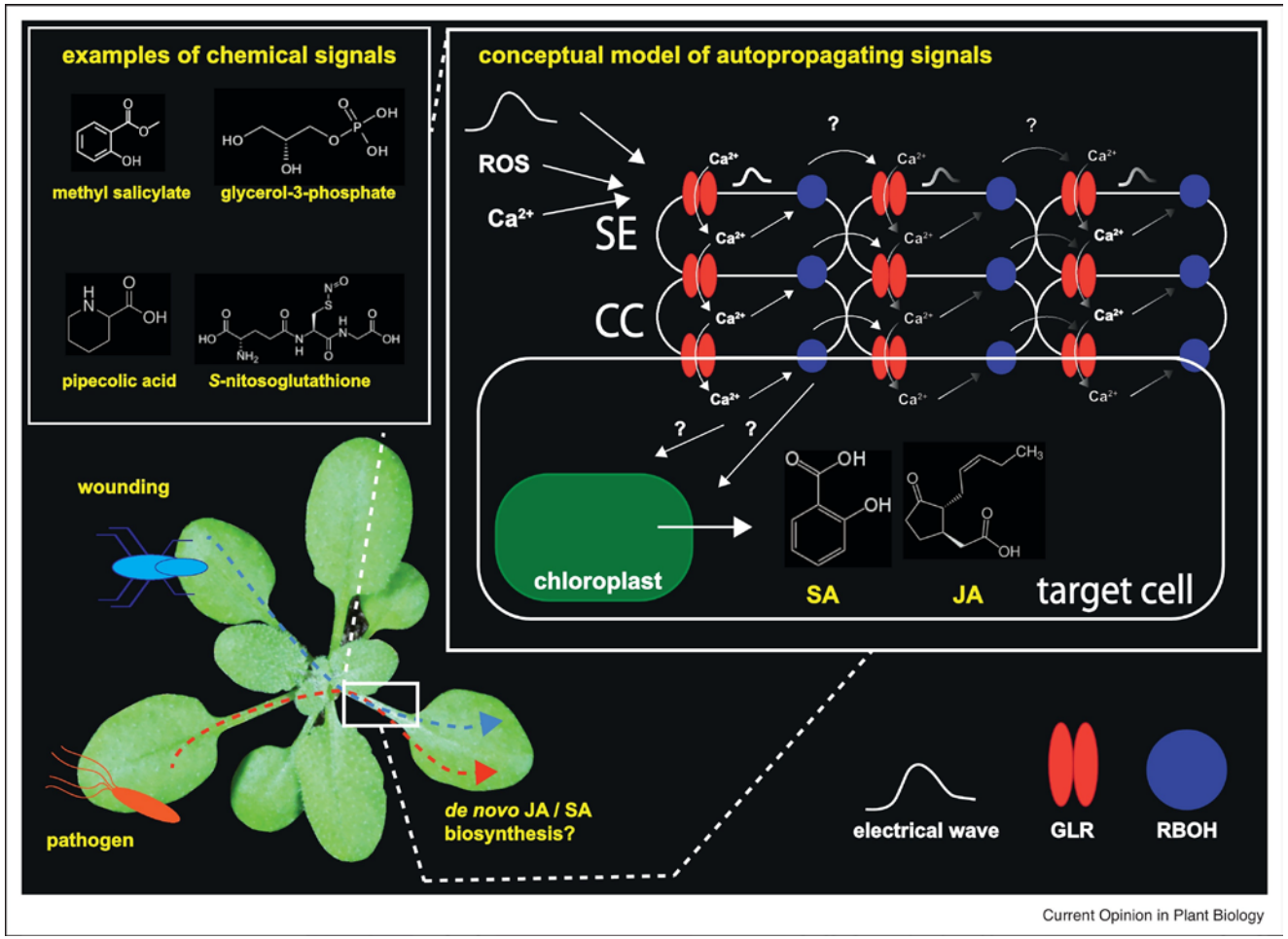
SA and other infochemical mediate systemic resistance



The structure of salicylic acid (SA) and the long-distance systemic acquired resistance signals methyl salicylate (MeSA), azelaic acid (AzA), glycerol-3-phosphate (G3P), dehydroabietinal (DA), and pipecolic acid (Pip).

Systemic signaling

Traveling chemical compounds?

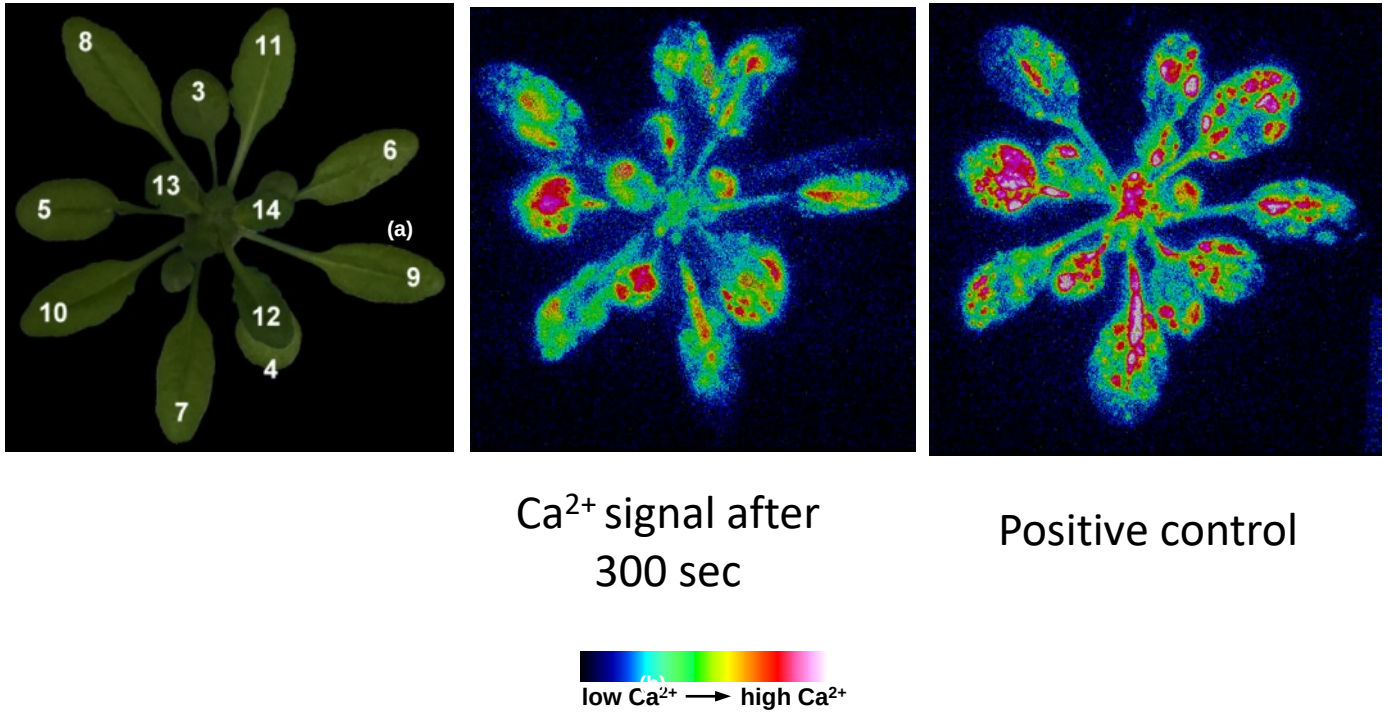


Seve elements and companion cells in phloem used Ca^{2+}, ROS and electric waves

Target cells induces SA- or JA-dependent defense responses

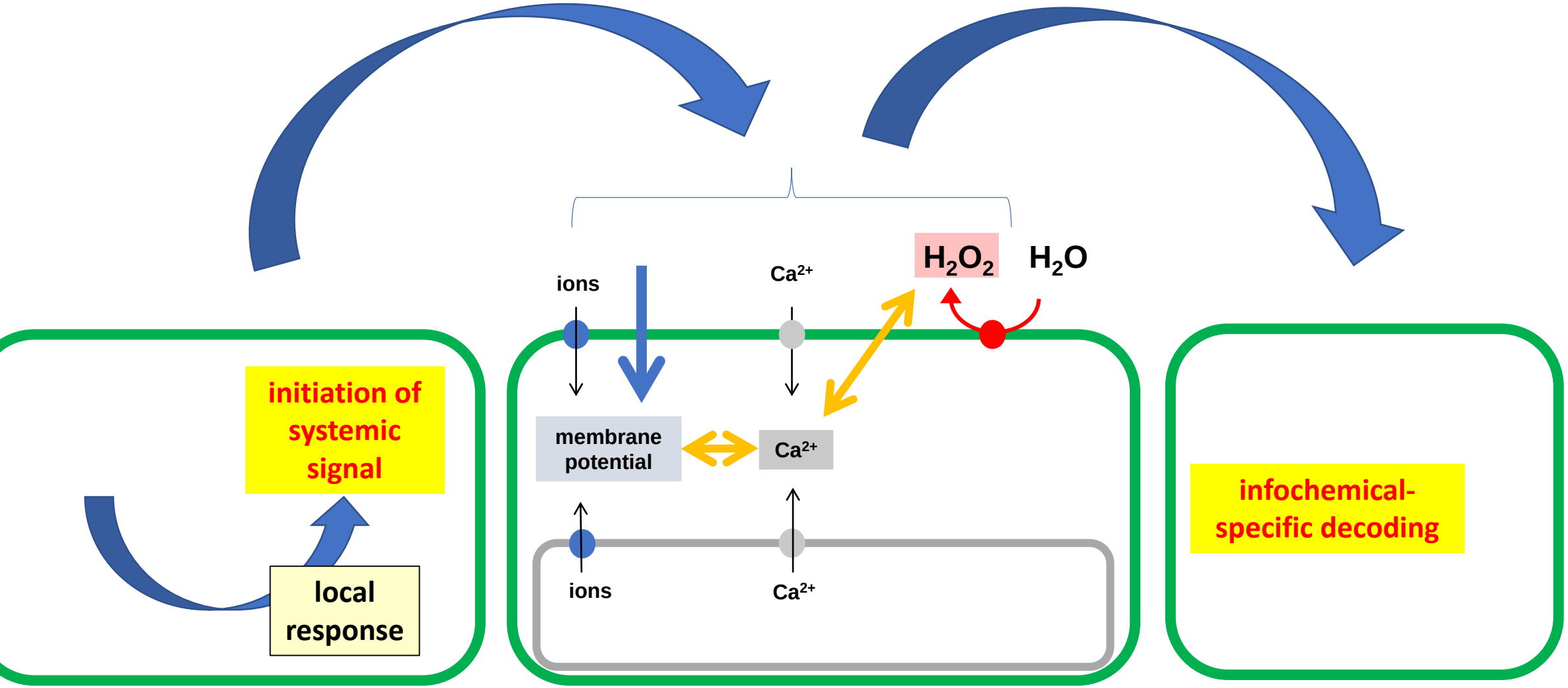
What travels in response to what, and how is a stimulus-related response achieved?

Threat to roots → $[Ca^{2+}]_{cyt}$ elevation in leaves



Ca^{2+} signal after 300 sec

Positive control



Systemic signaling = Ca^{2+}, ROS and electric waves