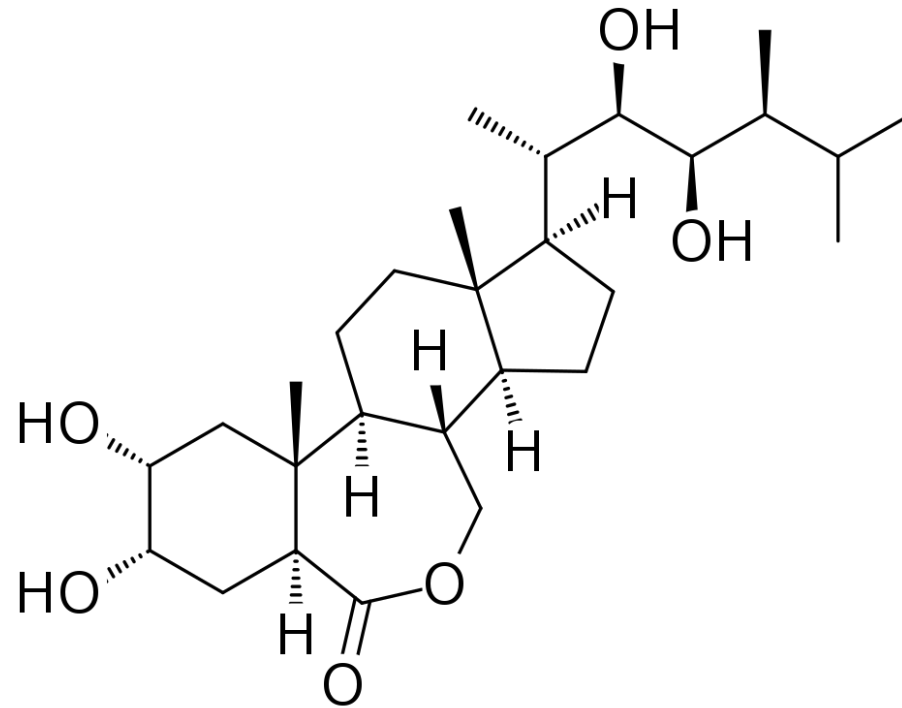


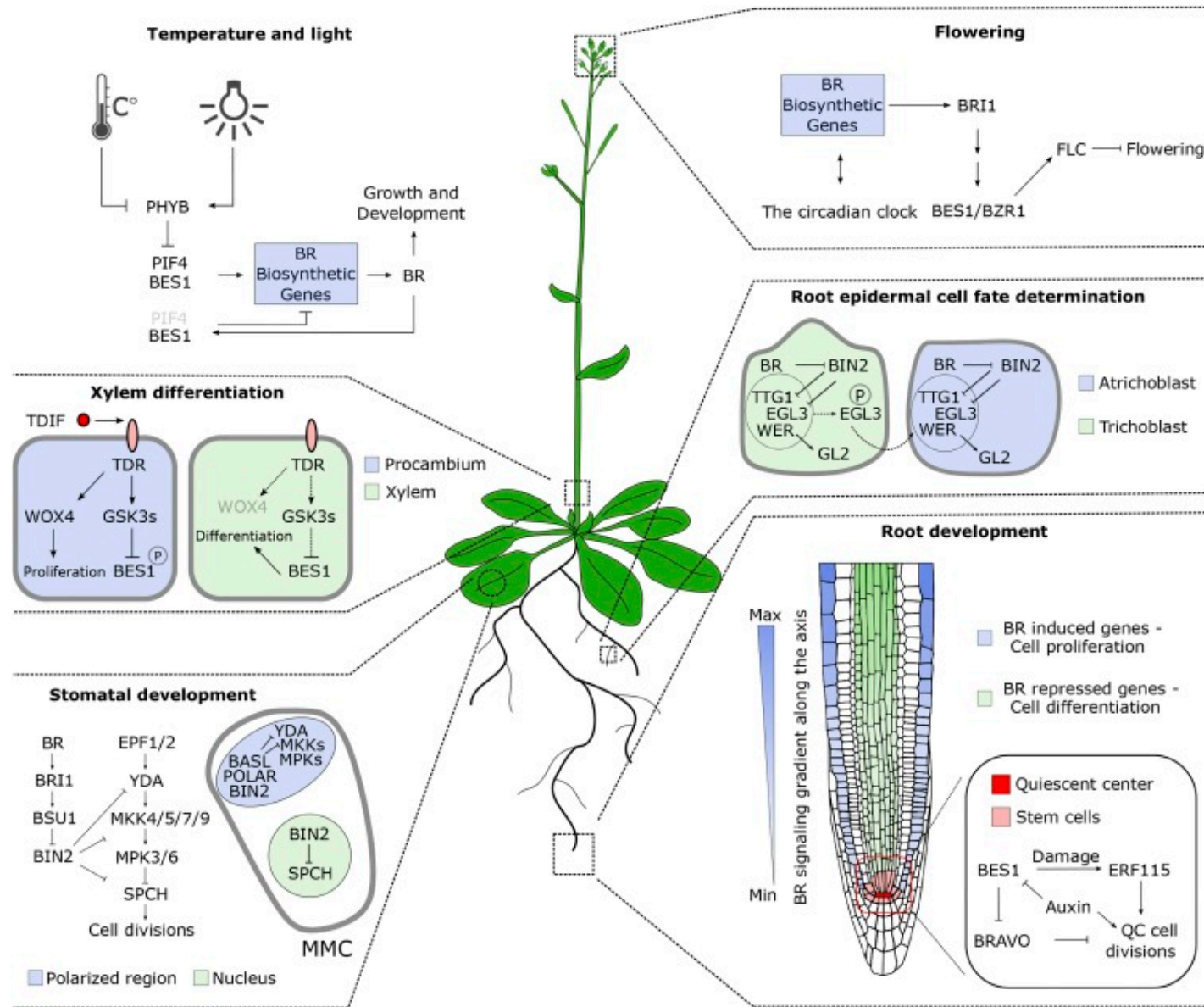
Brassinosteroids (BR)



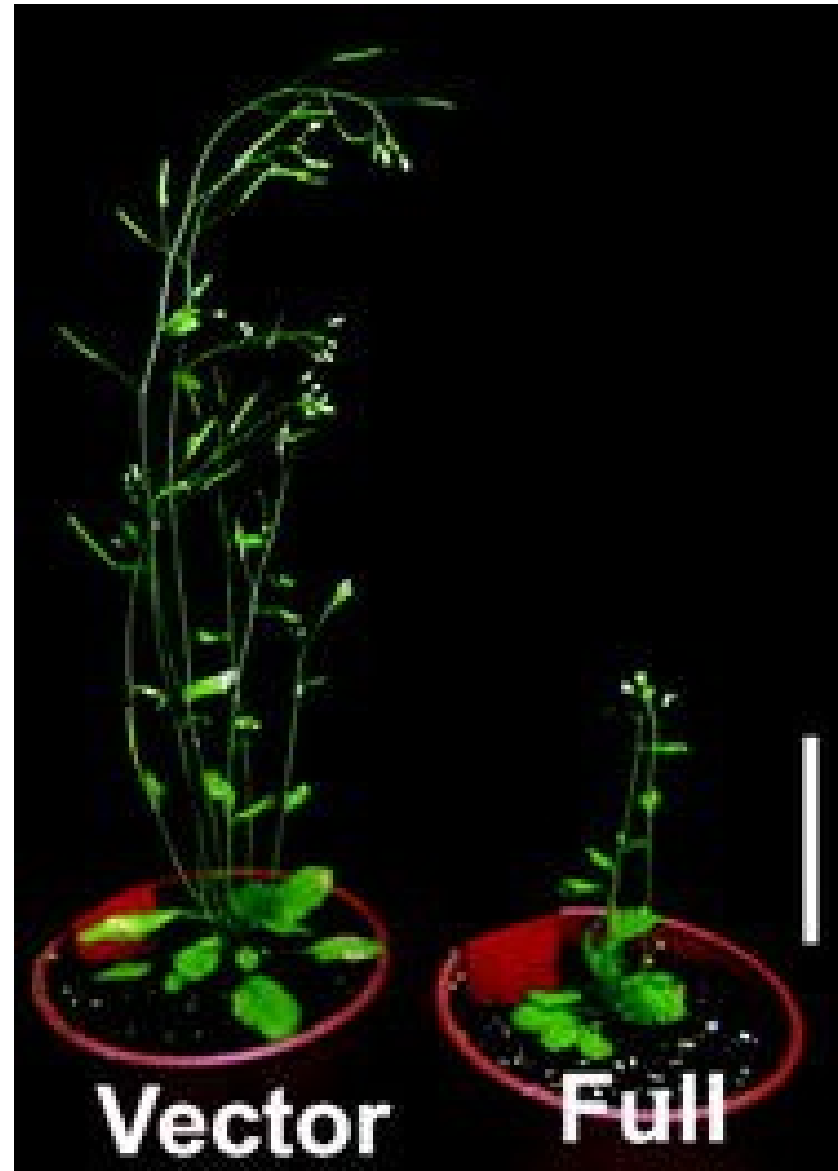
Function of BR

- cell expansion, elongation and division (with auxin)
- Differentiation of vascular tissue
- Pollen tube formation
- protection against chilling and drought stress
- Strengthen primary metabolism and promotes (a)biotic stress responses

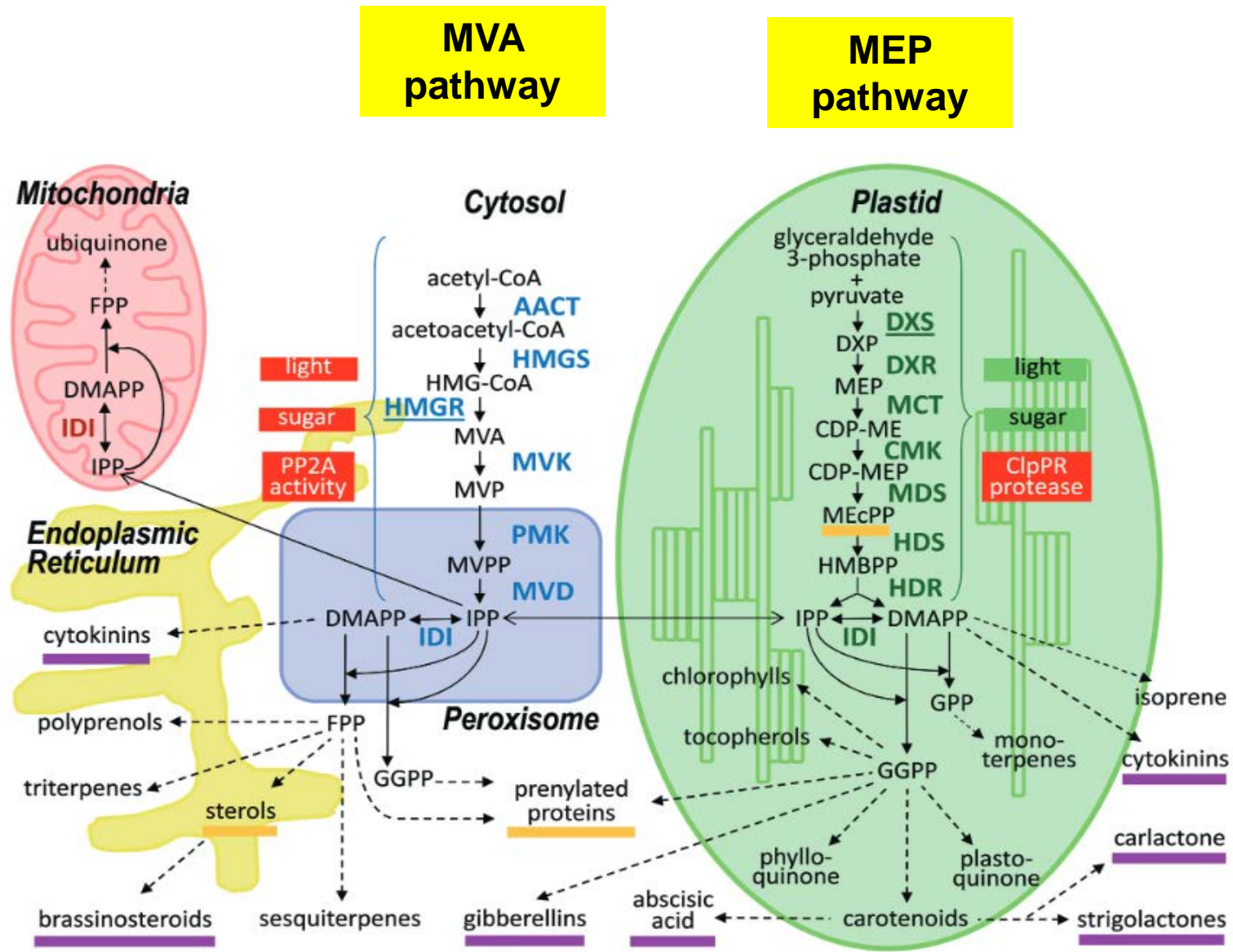
BR regulation in Arabidopsis – additional BR responses



ko mutants with dwarf
phenotype



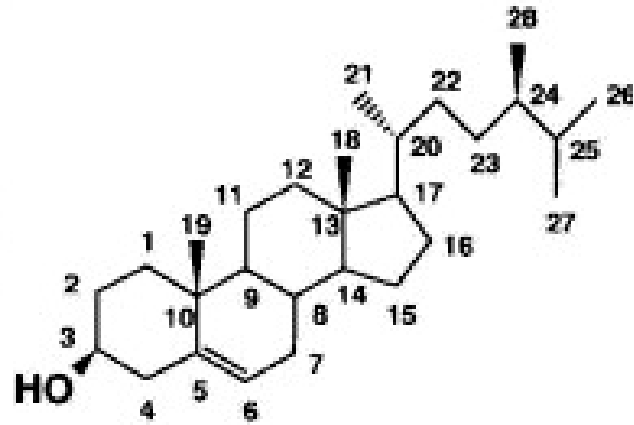
BR is synthesized by the isoprenoid pathway



BR biosynthesis pathway

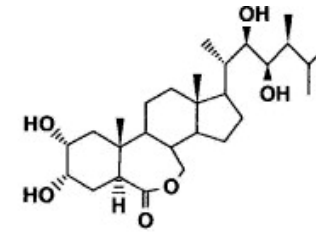
-Biosynthesis starts with campesterol
More than 40 isoforms known

Isoprenoid pathway

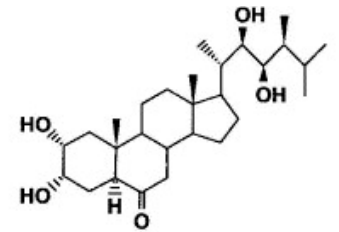


Campesterol

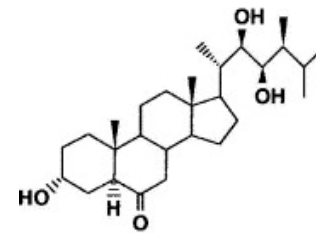
many P450 enzymes



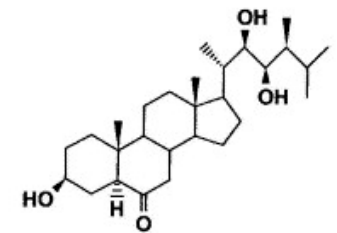
Brassinolide



Castasterone



Typhasterol



Teasterone

BR biosynthesis include many P450 reactions

P450 enzymes



P450s catalyze the stereospecific oxidation of unactivated hydrocarbons. P450s exist ubiquitously in more than 5,000 species. In plants, there are 245 genes in *Arabidopsis thaliana*, 334 in *Oryza sativa*, 316 in *Vitis vinifera*, 332 in *Glycine max*, 71 in *Physcomitrella patens*, 40 in *Chlamydomonas*, and 19 in *Volvox*.

The number of plant P450s is particularly large compared with number in *Drosophila* (87 genes) and humans (56 genes).

P450 is a hemoprotein containing heme iron at the active center and a cysteine-derived thiolate anion coordinated with heme iron. Plant P450s localize to the endoplasmic reticulum membrane and catalyze the oxidation of substrates by activating molecular oxygen in conjunction with the NADPH-P450 reductase.

BR signaling

