

Fungal melanin could adapt tolerance to UV-C light



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Introduction



Background

- UV-C light (200-280nm) can combat a variety of microorganisms, including necrotrophic fungi like *Botrytis cinerea* (grey mould), offering a viable alternative to agrochemical control. Successfully deployed against powdery mildew fungus.
- Must strike a balance between controlling pathogen and avoiding damage to crop plant

Objectives

- Evaluate changes in gene expression after treatment with UV-C light
- Link phenotypic changes ↔ gene expression changes ↔ accumulation of melanin product

Methods

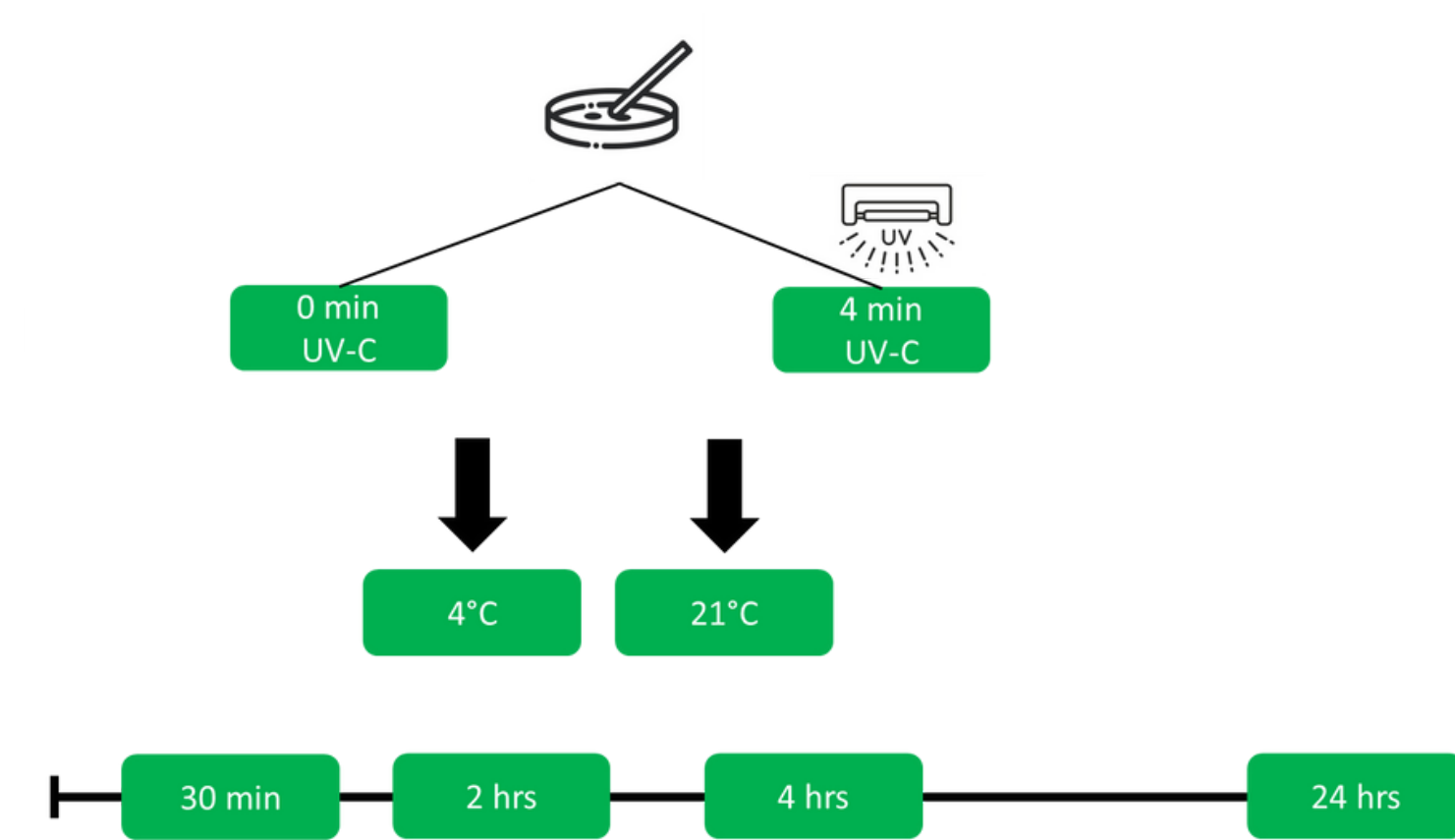
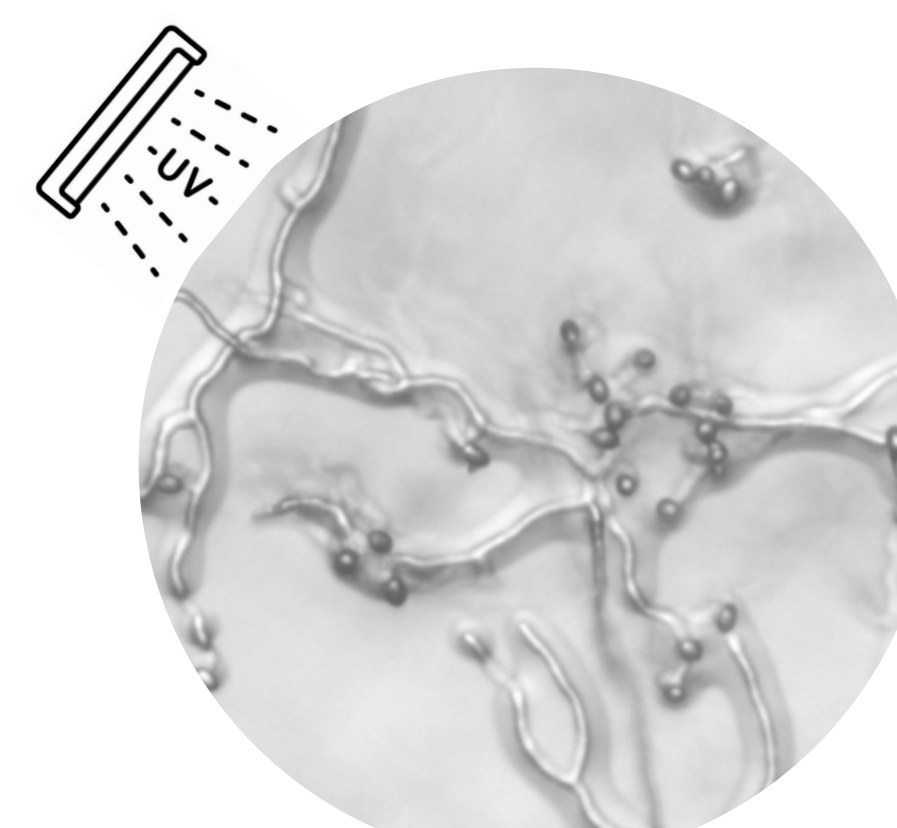


Fig. 2. Experimental setup for gene expression assay.



99% germination

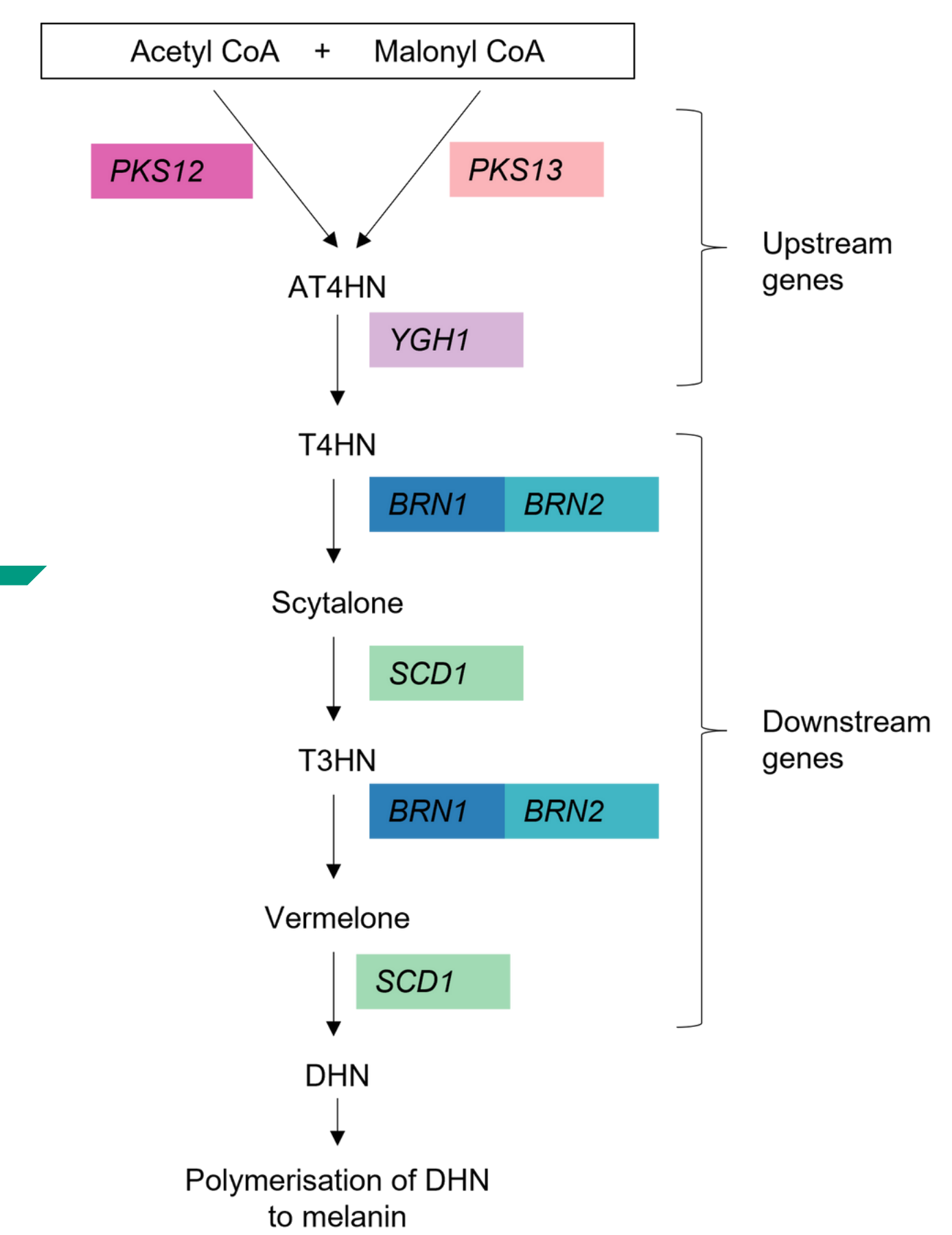
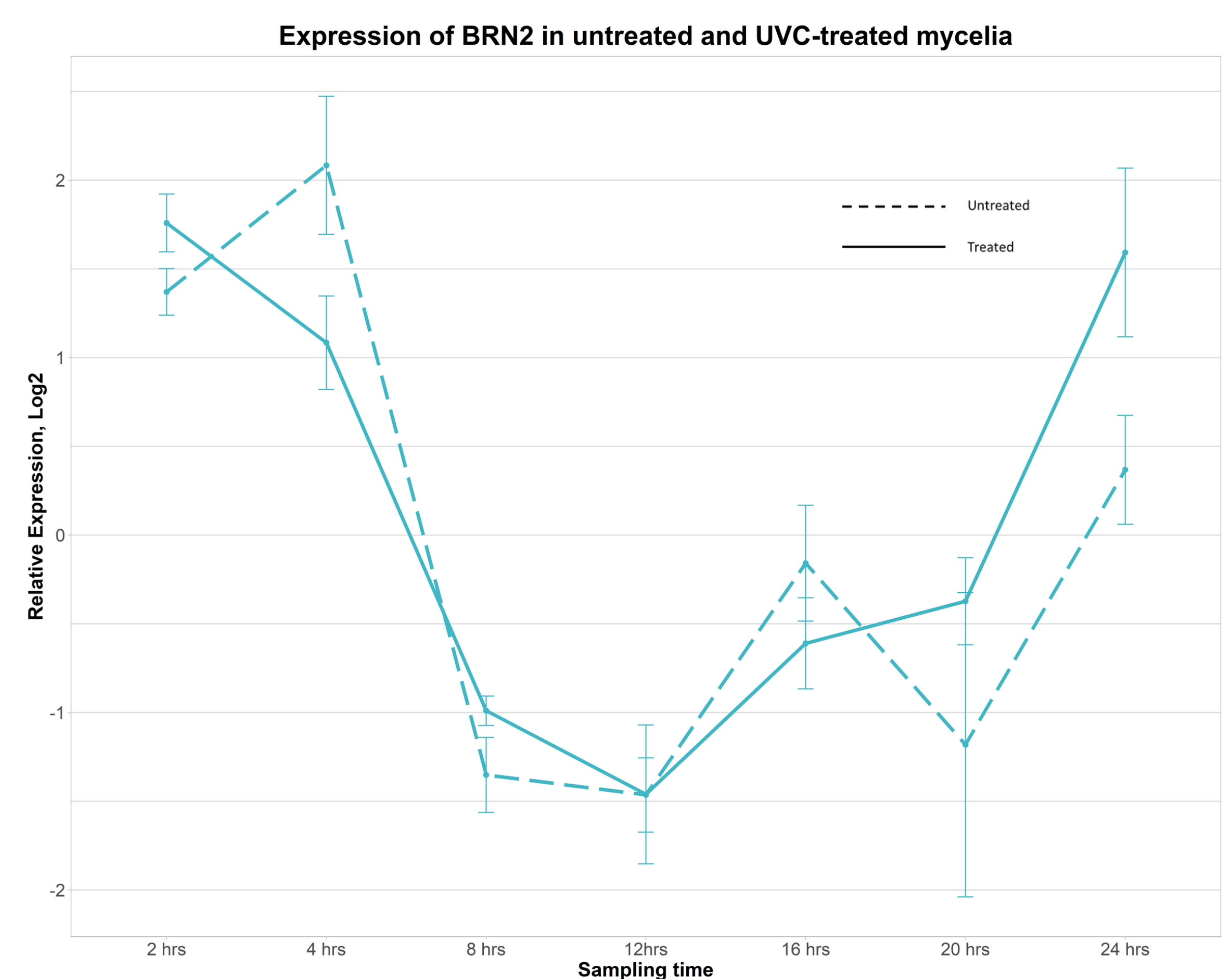
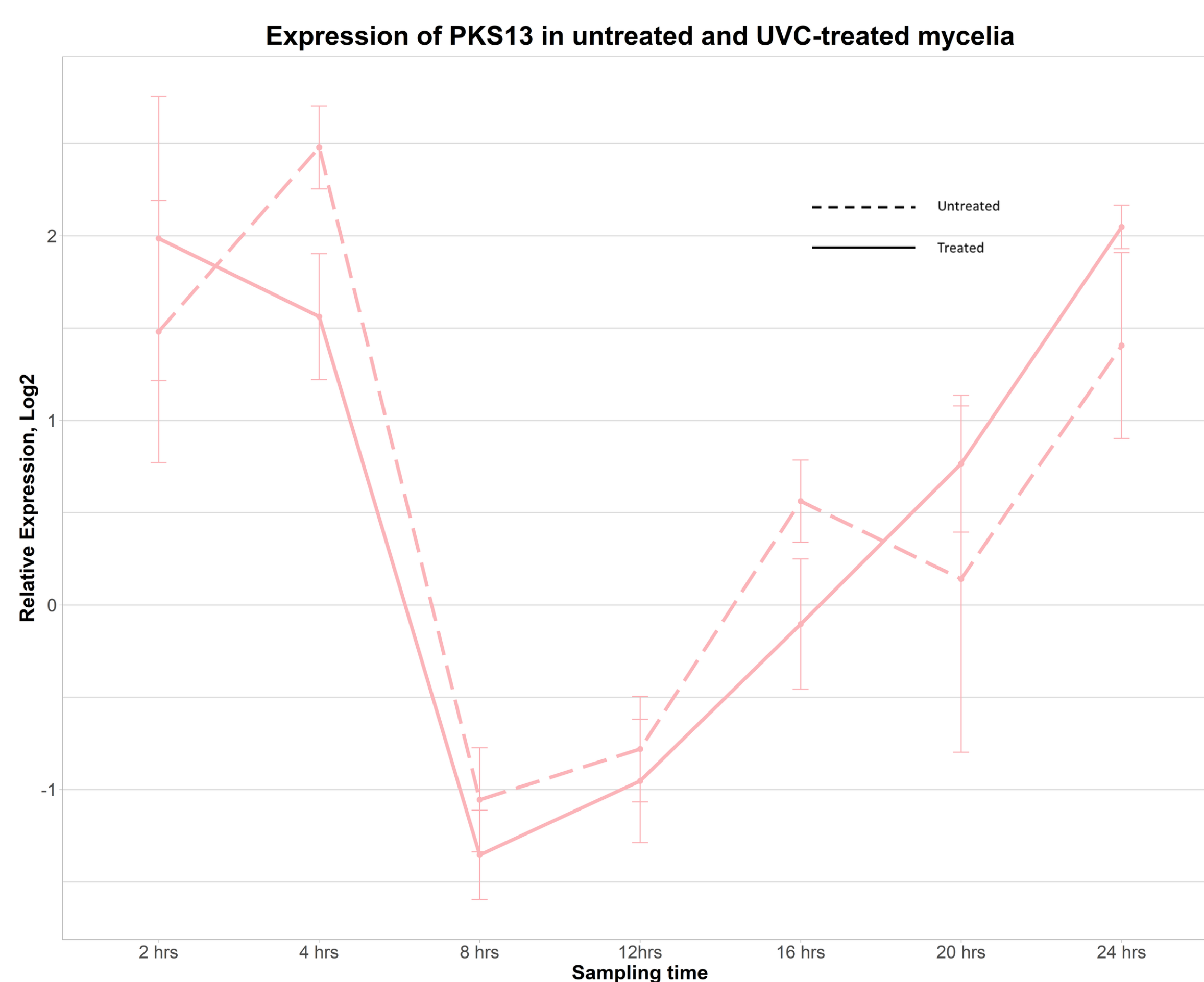


Fig. 1. Biosynthetic cascade of DHN melanin in *Botrytis cinerea*. Colours correspond to expression assay in Fig. 3.

Results & Implications



Gene expression

- Clear diurnal pattern that seems relatively unaffected by DNA-damaging UVC radiation (Hevia *et al.*, 2015).
- Similar expression pattern between upstream PKS13 gene and downstream BRN2 gene, indicating close association
- Melanisation could be at the cost of normal germinating time, with 7% germination occurring only 24 hrs PE (Janisiewicz *et al.*, 2016).
- Mycelia that are better established might require less rapid melanin generation, possibly relying on other rapid DNA repair mechanisms such as photolyase (*CRY1*, not shown).

Further work

- Extract melanin from untreated and treated grey mould; thereafter, measure absorbance to link gene expression with associated melanin accumulation
- Further investigation into molecular mechanisms related to melanin expression and possible diurnal activity
- Related experiments infecting strawberry (*Fragaria ananassa* cv. Favori) and grey mould, to investigate interaction transcriptome, post-UV-C exposure.

References

- Hevia *et al.*, 2015. <https://doi.org/10.1073/pnas.1508432112>
- Janisiewicz *et al.*, 2016. <https://doi.org/10.1094/PHYTO-09-15-0240-R>