Regulation of the hemoglobin/NO cycle in barley infected with powdery mildew or yellow (stripe) rust

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Nitric oxide (NO) is an important cellular signaling molecule in plants. It is involved in a range of physiological functions in plants. NO plays a particular central role in plant responses to biotic stresses, where it seems to function at different molecular levels including formation of nitrosylated proteins and cross-interference with various reactive oxygen species. Plant hemoglobins are important modulators of the NO signal, presumably by an oxidative mechanism including the direct reaction with O_2. When biotrophic pathogens infect plants, the pathogen and the plant are struggling to take control over gene expression towards either compatibility or incompatibility. Our previous studies have shown that artificial up-regulation or silencing of endogenous hemoglobins in plants can modulate NO levels during pathogen infection to an extent where susceptibility levels are severely changed. We here show how barley plants infected with either powdery mildew (*Blumeria graminis* f. sp. *hordei*) or yellow (stripe) rust (*Puccinia striiformis* f. sp. *hordei*) are struggling with the respective pathogen to control hemoglobin gene expression.