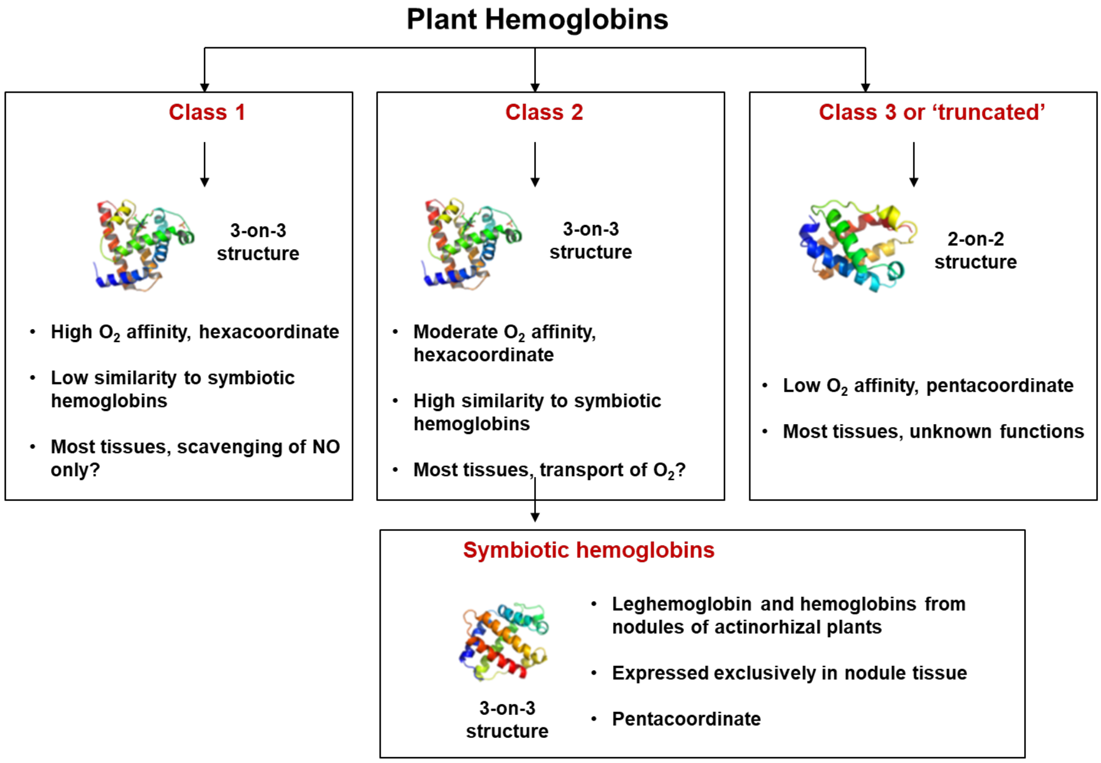

Figure 1. Diversity of structures and possible functions of plant hemoglobins. Pentacoordinate indicate that the 5th position of the heme is coordinated to a histdine residue (proximal His), whereas the 6th position is free to bind physiological ligands such as O_2 and NO. Hexacoordinate indicates that both the 5th and 6th positions are coordinated to amino acid residues (the proximal and distal His). However, hexacoordinate hemoglobins also bind to O_2 and, in fact, the distal His stabilizes the binding, so that they have much higher O_2 affinity than pentacoordinate hemoglobins. Symbiotic hemoglobins are pentacoordinate and derived evolutionarily from class 2 Glbs, and transport O_2 at a low and steady concentration to the endosymbiont (rhizobia in legume nodules or frankiae in actinorhizal nodules).

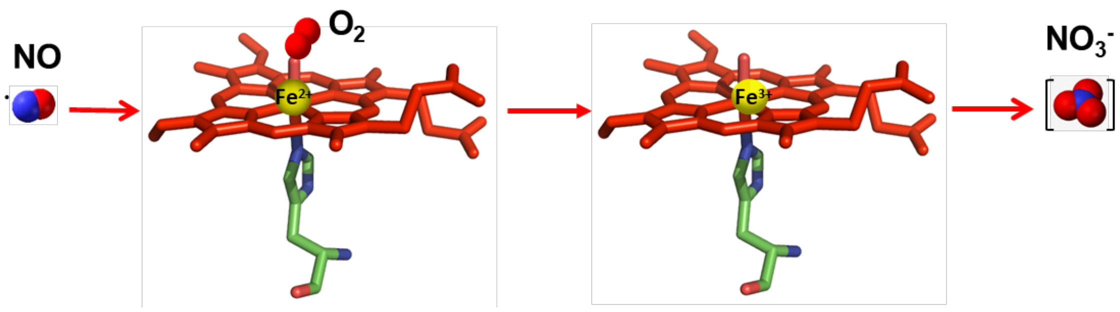

Figure 2. Scheme showing the nitric oxide dioxygenase (NOD) activity of the oxyferrous form ($Fe^{2+}O_2$) of hemoglobins. This form has Fe^{2+} in the heme and a bound O_2 molecule. Then, the heme binds NO, which reacts with O_2 to produce nitrate, leaving the hemoglobin in its ferric (Fe^{3+}) form.

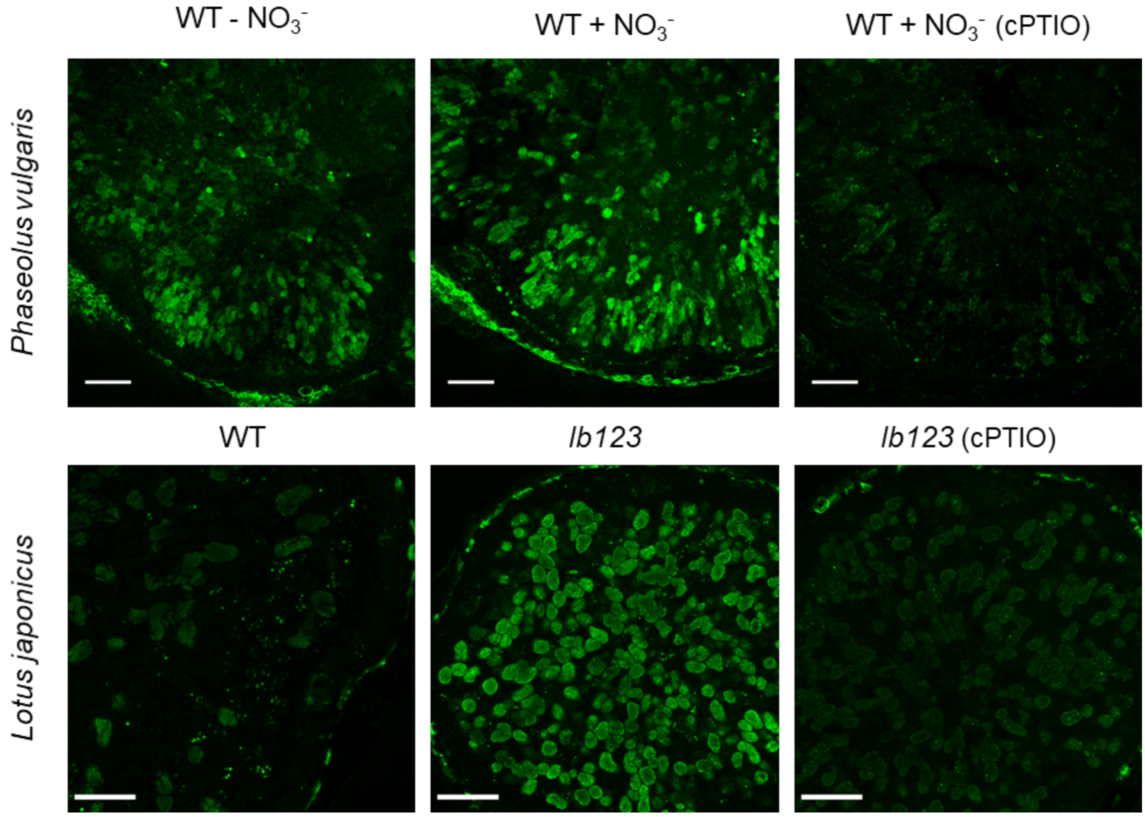

Figure 3. Production and localization of NO in nodule sections with the fluorescent dyes DAF-2 diacetate (upper panels) and DAF-FM diacetate (lower panels) and visualized by confocal microscopy. In common bean nodules note a higher green fluorescence (NO production) in nodules of WT plants treated with nitrate compared with untreated nodules. In *L. japonicus* nodules note that the nodule of the *lb123* mutant displays a much higher signal than the WT nodule. Nodule sections of both legumes incubated with the NO scavenger cPTIO show a drastical inhibition of NO production. Bars: upper panels (200 μm), lower panels (150 μm).