Supplementary Figure 1: Arabidopsis rosettes used to assess trace gas emissions following pathogen attack.

Arabidopsis rosettes of Col-0 and the Glb line photographed prior to measurement of trace gas measurements using either the Quantum Casade Laser (for NO) or laser photoacoustic detector (for ethylene). Bar = 1 cm

Supplementary Figure 2: The Quantum Cascade Laser (QCL)-based sensor adapted for Nitric Oxide detection.

A quantum cascade laser (QCL) emitting around 1900 cm$^{-1}$ wavelength passes through a multi-pass cell where the NO released by the biological samples is transported with a carrier flow of air via gas tubing to the multi-pass cell at a flow rate of 1 L/h. The intensity of the laser ($I_0$) is strongly attenuated due to the NO absorption of the light in the multi-pass cell (effective path length $L = 76$ m), following the Beer–Lambert law. The detected signal ($I$) depends of the laser intensity ($I_0$), the absorption path length ($L$) and the molar absorption coefficient ($\varepsilon$) of NO at this wavelength. The NO concentration is calculated by measuring the attenuation of the light ($I/I_0$).
**Supplementary Figure 3:** Glb1 and Glb2 expression in the over-expression lines.

Detection of Glb1 and Glb2 protein accumulation in protein extracts from mature rosettes of Col-0, 35S-GLB1 and 35S-GLB2. Note the over-accumulation of GLB1 in 35S-GLB1 and GLB2 in 35S-GLB2 lines.

**Supplementary Figure 4:** Nitric oxide, salicylic acid and ethylene production and from Arabidopsis lines with modified hemoglobin expression on inoculation with *Pseudomonas syringae pv. tomato*.

**(A)** NO production was determined from *Arabidopsis* Col-0 and the hemoglobin (Hb) GLB11 RNAi suppressed Arabidopsis line *glb1* and the CaMV 35S-GLB11 over-expression line, following inoculation with virulent *Pseudomonas syringae pv. tomato* (Pst) DC3000 strains. NO was determined using a Quantum Cascade Laser system. **(B)** Salicylic acid accumulation at 48 h post inoculation of *Arabidopsis* Col-0, *glb1* and 35S-GLB1 with Pst (grey bar) or mock-inoculated with 10 mM MgCl₂ (White bar). Results are given as mean μmol SA (n = 6) per g fresh weight (g fwt) ± SE. Statistical comparison was made between inoculated Col-0 with *glb1* or 35S-GLB1 plants and also between mock-inoculated and *glb1* or 35S-GLB1 plants. Levels of significant are indicated: NS = no significant difference; * P < 0.05, ** P <0.01 and *** P < 0.001. **(C)** Ethylene production was determined using laser photoacoustic detection (LPAD) from *Arabidopsis* Col-0 and *glb1* and 35S-GLB11 following inoculation Pst.
**Beer Lambert law**

\[ I = I_0 \times \exp(-\varepsilon \times C \times L) \]

- \( I \) = transmitted laser intensity
- \( I_0 \) = incident laser intensity
- \( \varepsilon \) = molar absorption coefficient
- \( L \) = absorption length
- \( C \) = NO concentration

**Diagram Description:**
- QC Laser
- Gas flow in (1 L h\(^{-1}\))
- Gas out
- Absorption multi-pass cell
Supplementary Figure 3.
Supplementary Figure 4.