

P005 Discrimination between nitrate and nitrite by the model laboratory organism, *Escherichia coli*, and the obligate human pathogen, *Neisseria gonorrhoeae*.

Rebekah N. Whitehead and Jeff A. Cole

*School of Biosciences, The University of Birmingham,
Edgbaston, Birmingham, B15 2TT, U.K.*

Bacteria that respire anaerobically or in oxygen-limited conditions require a terminal electron acceptor other than oxygen. The model organism, *Escherichia coli*, uses both nitrate and nitrite as terminal electron acceptors. It senses these ligands by means of dual-acting two-component regulatory systems, NarX-NarL and NarQ-NarP. NarX and NarQ are membrane-bound proteins that become autophosphorylated in the presence of nitrate or nitrite. Phosphorylated NarX and NarQ transfer the phosphate group to the cytoplasmic proteins, NarL and NarP, which bind to the promoters of certain genes and activate or repress transcription. *Neisseria gonorrhoeae*, the bacterium that causes the sexually transmitted disease gonorrhoea, has only one homologous two-component regulatory system, which is termed NarQ-NarP. It can sense nitrite but is completely insensitive to nitrate. To investigate how the sensor proteins discriminate between nitrate and nitrite, mutations have been created that make the *E. coli* NarQ similar to the gonococcal NarQ. Some mutations inactivated the response of the protein to both nitrate and nitrite but, as yet, no mutation has allowed nitrite sensing alone. Further mutagenic studies are underway to discover which part of the NarQ protein discriminates between nitrate and nitrite.