



home | meetings | [programme](#) | registration | abstracts | general info | get involved | links | contact us



## Joint 62nd Harden Conference/EMBO Workshop - NO; a radical in control. The biological diversity of nitric oxide metabolism and signalling

Royal Agricultural College, Cirencester, UK

4 - 8 April 2006

Poster abstract submission is now closed

### Organizers

Chris Cooper (University of Essex, UK)  
Valerie O'Donnell (Cardiff University, UK)  
Alan Wallace (AstraZeneca, UK)

Nitric oxide (NO) is a free radical and intercellular messenger with a rich biological chemistry. The discovery of the biological functions of nitric oxide in the 1980s came as a complete surprise and caused quite a stir.

We intend to focus on the more biochemical aspects of NO research, and in doing so will bring together researchers from across phylogenetic divisions who are studying similar chemistry in different molecular and biological environments. The meeting will feature work on plant, animal and bacterial systems and will focus on the control of NO generation and destruction, in addition to its role in signalling and regulation in normal physiology and pathology.

This is important since there are significant parallels between NO pathways in different systems. Recently the first plant NO generating enzymes have been identified and new pathways for both prokaryotic and eukaryotic cells to metabolize NO have been described.

The meeting will address both progress in understanding traditional roles for NO, and other functions that are only now becoming apparent. We shall explore ways in which proteomics and structural work is driving forward our understanding of the ways in which NO acts to control the functions of other enzymes.

In addition to the invited speakers we hope to add a number of shorter talks, chosen from submitted abstracts. These are likely to be by younger researchers who are making outstanding contributions in the field.

## Scientific Programme

### Sponsors

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### Timetable

Tuesday 4 April 2006	Wednesday 5 April 2006	Thursday 6 April 2006	Friday 7 April 2006	Saturday 8 April 2006
17:00-21:00 <a href="#">NO chemistry and metabolism (1)</a>	09:00-20:30 <a href="#">NO chemistry and metabolism (2)</a>	09:00-20:30 <a href="#">NO and enzymology</a>	09:00-17:40 <a href="#">NO signalling and physiology (1)</a>	09:00-11:40 <a href="#">NO signalling and physiology (2)</a>

## NO chemistry and metabolism (1)

Tuesday 4 April 2006

13:30-16:45 **Conference Registration**

### Quick search



[Search Tips](#)

- ▶ [Programme](#)
- ▶ [Registration](#)
- ▶ [General Information](#)
- ▶ [Travel arrangements for delegates](#)

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- ▶ [Harden conferences](#)
- ▶ [Submit a meeting proposal](#)
- ▶ [Proposals timetable](#)
- ▶ [Proposals deadlines](#)
- ▶ [Meetings board](#)
- ▶ [Theme panels](#)
- ▶ [IT supported groups](#)
- ▶ [Terms of reference](#)
- ▶ [Medals and lectures](#)
- ▶ [Apply for a grant](#)
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[Published meetings](#)



16:45-17:00 **Introduction**

## Session 1

*Chair*

**Chris Cooper** (University of Essex, UK)

17:00-17:30 **Chris Cooper** (University of Essex, UK)

Nitric oxide biochemistry - across biological kingdoms

17:30-18:00 **Jack Lancaster** (University of Alabama at Birmingham, USA)

NO and Her Children in the Biological Milieu: Chemical and Physical Determinants of Action

18:00-19:30 **Dinner**

## Session 2

*Chair*

**Rafael Radi** (Universidad de la Republica, Uruguay)

19:30-20:00 **Guy Brown** (University of Cambridge, UK)

NADPH oxidases determine nitric oxide level and activity

20:00-20:30 **Robert Poole** (University of Sheffield, UK)

NO news is bad news - how bacteria cope

20:30-21:00 **Bernd Mayer** (University of Graz, Austria)

The role of mitochondria in the bioactivation of nitroglycerin and nitrite

21:00-22:00 **Wine Reception**

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# NO chemistry and metabolism (2)

Wednesday 5 April 2006

## Session 3

*Chair*

**Rakesh Patel** (University of Alabama at Birmingham, USA)

9:00-9:30 **Rafael Radi** (Universidad de la Republica, Uruguay)

Peroxynitrite biochemistry: reaction mechanisms, preferential targets and biological significance

9:30-10:00 **Kevin Moore** (University College London, UK)

The assessment of nitration and nitrosation reactions *in vivo*

10:00-10:20 **Selected oral communication - Milos Filipovic** (University of Belgrade, Serbia and Montenegro)

Identification of the reaction product of ascorbate and nitrite as a potential repository of NO in vivo

10:20-11:50 **Coffee/tea and Poster Session**

12:00-12:50 **Lunch**

13:00-16:30 **Coach trip to Bourton on the Water**

## Session 4

*Chair*

**Bernd Mayer** (University of Graz, Austria)

17:00-17:30 **Andrew Gow** (Rutgers University, USA)

Why NO is a biochemical T.A.R.D.I.S! Lessons from babies and invertebrates

17:30-17:50 **Selected oral communication - Kim Henrik Hebelstrup** (University of Aarhus, Denmark)

Nitric oxide scavenging is an essential function of plant haemoglobin

17:50-18:10 **Selected oral communication - Sarah O'Neill** (Royal College of Surgeons in Ireland, Ireland)

Nitric oxide modifies thiols in the platelet integrin  $\alpha$ IIb $\beta$ 3 as revealed by Raman spectroscopy

18:15-19:30 **Dinner**

## Session 5

*Chair*

**Kevin Moore** (University College London, UK)

19:30-20:00 **Rakesh Patel** (University of Alabama, USA)

Red Cells, hypoxia and nitrite constitute a functional system for regulating blood flow in health and disease

20:00-20:30 **Phil James** (Cardiff University, UK)

NO reserve in the microcirculation

20:30- **Discussion and drinks - SNO and HbNO measurements** (Phil James and Rakesh Patel)

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# NO and enzymology

Thursday 6 April 2006

## Session 6

### Chair

**Dennis Stuehr** (Lerner Research Institute, USA)

9:00-9:30 **Hideo Yamasaki** (University of the Ryukyus, Japan)

Nitrite-dependent NO production pathway in plants

9:30-10:00 **Francesca Cutruzzola** (University of Rome, Italy)

Pseudomonas Aeruginosa nitrite reductase: Catalytic and regulatory mechanisms

10:00-10:20 **Selected oral communication - Faye Thorndycroft** (University of East Anglia, UK)

Defining the Proton Conducting "E-Channel" in a Bacterial Nitric Oxide Reductase

10:20-12:00 **Coffee/tea and poster session**

12:00-13:00 **Lunch**

13:30-16:30 **Afternoon activities**

## Session 7

### Chair

**Francesca Cutruzzola** (University of Rome, Italy)

17:00-17:30 **Michael Wilson** (University of Essex, UK)

Nitric oxide interactions with copper containing oxidases

17:30-17:50 **Selected oral communication - Elena Forte** (University of Rome "La Sapienza", Italy)

The bacterial cytochrome bd oxidase and nitric oxide

17:50-18:10 **Selected oral communication - Nicholas Tucker** (John Innes Centre, UK)

A novel non-haem iron centre senses nitric oxide in Escherichia coli NorR.

18:15-19:30 **Dinner**

## Session 8

### Chair

**Alan Wallace** (AstraZeneca, UK)

19:30-20:00 **Dennis Stuehr** (Lerner Research Institute, Cleveland Clinic, USA)

Catalysis and Regulation in the NO synthases

20:00-20:30 **Nigel Crawford** (University of San Diego, USA)

Nitric Oxide Synthesis and Regulation in Plants

20:30- **Discussion and drinks - NO synthesis across kingdoms** (Dennis Stuehr and Nigel Crawford)

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# NO signalling and physiology (1)

Friday 7 April 2006

## Session 9

### Chair

**Valerie O'Donnell** (Cardiff University, UK)

9:00-9:30 **Doris Koesling** (Bochum University, Germany)

NO/cGMP signalling

9:30-10:00 **David Wendehenne** (Université de Bourgogne, France)

A fundamental role for NO in mediating Ca<sup>2+</sup> fluxes in plant cells

10:00-10:20 **Selected oral communication - Peter Brouckaert** (Ghent University and VIB, Belgium)

Retained sensitivity to NO and male hypertension in sGC $\alpha$ 1 knockout mice

10:20-11:00 **Coffee/tea break**

11:00-11:30 **Bruce Freeman** (University of Pittsburgh, USA)

Nitric oxide regulation of lipid signalling

11:30-12:00 **Steven Neill** (University of the West of England, UK)

Nitric oxide mediation of plant responses to environmental signals

12:00-12:20 **Selected oral communication - Gary Loake** (University of Edinburgh, UK)

A central role for S-nitrosylation in plant disease resistance

12:20-14:00 **Lunch**

## Session 10

### Chair

**Victor Darley-USmar** (University of Alabama, USA)

- 14:00-14:30 **Pamela Manning** (Pfizer, USA)  
Selective iNOS inhibition in pain and inflammation
- 14:30-15:00 **Richard Knowles** (GlaxoSmithKline, UK)  
Lung iNOS: Good guy, bad guy, both or neither?
- 15:00-15:20 **Selected oral communication - Andreas Strub** (ALTANA Pharma AG, Germany)  
BYK191023, a novel imidazopyridine is a potent and highly selective inhibitor of the inducible nitric oxide synthase in vitro and in vivo
- 15:20-16:00 **Coffee/tea break**
- 16:00-16:30 **Alan Wallace** (AstraZeneca, UK)  
Taking control of NO production; the basis of inhibitor binding and selectivity
- 16:30-16:50 **Selected oral communication - Matt Whiteman** (National University of Singapore, Republic of Singapore)  
Peroxynitrite-modified collagen-II induced synthesis of NO and other inflammatory mediators in chondrogenically differentiated mesenchymal progenitor cells: Implications for cartilage damage and repair in the diseased human joint
- 16:50-17:20 **Valerie O'Donnell** (Cardiff University, UK)  
Crosstalk between nitric oxide and cyclooxygenase isoforms in the vasculature
- 17:20-17:40 **Selected oral communication - Jonathan Morton** (Cardiff University, UK)  
Modulation of vascular tone by neutrophils in vivo
- 17:40-19:00 **Free time**
- 19:00-21:30 **Wine and Banquet Dinner**
- 21:30-23:30 **Live music by Ben & Rachel (The Tithe Barn)**

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## NO signalling and physiology (2)

Saturday 8 April 2006

Session 11

*Chair*

**Bruce Freeman** (University of Alabama, USA)

- 9:00-9:30 **Cecilia Giulivi** (University of California - Davis, USA)  
Protein-protein interactions of mitochondrial nitric-oxide synthase
- 9:30-9:50 **Selected oral communication - Sergio Colombo** (University College London, UK)  
Mitochondria as signaling organelles in the vascular endothelium
- 9:50-10:10 **Selected oral communication - Victoria Kolb-Bachofen** (Heinrich-Heine-University, Germany)  
Altered gene expression by NO involves a zinc-dependent activation of transcription factors nrf-2 and MTF-1
- 10:10-10:45 **Coffee/tea**
- 10:40-11:10 **Victor Darley-USmar - Lecture sponsored by Waters Ltd** (University of Alabama at Birmingham, USA)  
7402 The interaction of mitochondria with reactive oxygen and nitrogen species and the role in cell signaling
- 11:10-11:40 **Joan Mannick** (University of Massachusetts, USA)  
S-Nitrosothiol Depletion in Amyotrophic Lateral Sclerosis
- 11:45-13:30 **Lunch and conference end**

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### Biochemical Society/Portland Press

Third Floor  
Eagle House  
16 Procter Street  
London  
WC1V 6NX  
United Kingdom  
[Map](#)

### Biochemical Society Membership Office

Portland Customer Services  
Commerce Way  
Whitehall Industrial Estate  
Colchester  
Essex  
CO2 8HP  
United Kingdom  
[Map](#)

### Administration:

Tel: 020 7280-4100 - Fax: 020 7280-4170  
E-mail: [genadmin@biochemistry.org](mailto:genadmin@biochemistry.org)

### Editorial:

Tel: 020 7280-4110 - Fax: 020 7280-4169  
E-mail: [editorial@portlandpress.com](mailto:editorial@portlandpress.com)

### Meetings:

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