



**Professor Stephen Edgar Halford**

**Foreign Member of the Lithuanian Academy of Sciences since 2011**

Emeritus Professor of Biochemistry and molecular cell biology, School of Biochemistry, University of Bristol since 1995. He was born 22 September, 1945, Cairo, Egypt. Nationality – British.

#### **ACADEMIC QUALIFICATIONS**

1986: University of Bristol. D.Sc. (by submission of published papers).

1970: University of Bristol. Ph.D. in Biochemistry.

1967: University of Bristol. B.Sc. in Biochemistry (grade II.i).

#### **PREVIOUS APPOINTMENTS**

1989-1995: Reader, Department of Biochemistry, University of Bristol.

1976-1989: Lecturer, Department of Biochemistry, University of Bristol.

1975-1976: Temporary Lecturer, Department of Biochemistry, University of Bristol.

1972-1975: Research Associate with Professor H. Gutfreund FRS, Department of Biochemistry, and with Professor M. H. Richmond FRS, Department of Microbiology, University of Bristol. Also collaborations with Professor B. D. Sykes FRS, then in the Department of Chemistry at Harvard.

1970-1972: Research Fellow with Professor M. J. Schlesinger, Department of Microbiology, Washington University, St Louis, USA.

#### **RESEARCH**

- Since starting my own laboratory in 1977, all of my research has been on the reactions of enzymes on DNA, principally restriction endonucleases. We examined first several enzymes that recognise and cleave DNA at solitary sites, primarily the EcoRV endonuclease. This work elucidated the mechanisms by which these enzymes interact with their recognition sequences in DNA, how they cleave DNA almost exclusively at these sites and nowhere else on the DNA,

despite often binding to all DNA sequences with similar affinities. It also helped to elucidate mechanisms for the hydrolysis of phosphodiester bonds in DNA, in particular the role of divalent metal ions in both catalysis and specificity. These studies have since become the framework for numerous subsequent studies in many other laboratories on the mechanisms of enzymes acting on DNA, not only other nucleases but also replication, recombination and repair systems. Other studies, in collaboration with Dr V. Siksnys (Institute of Biotechnology, Vilnius, Lithuania), on a unique restriction enzyme that functions without metal ions revealed significant new insights into another class of enzymes cutting phosphodiester bonds, yielding a novel mechanism for phosphodiester hydrolysis.

- Between 1983 to 1996, this laboratory also examined the mechanism of site-specific recombination by Tn21 resolvase from the transposon. The main objectives of this work was to elucidate the processes that lead to the juxtaposition of distant sites in DNA molecules, and the organisation of higher-order assemblies involving multiple protein subunits spanning separate sites. However, these questions can now be addressed with any of the restriction enzymes that cut DNA after interacting with two recognition sites.

#### **INDICATIONS OF EXTERNAL RECOGNITION**

- Editorial Board, *Nucleic Acids Research*, from 1995-present.
- Invitations to write reviews for, among others, *Annu. Rev. Biophys. Biomol. Struct.*, Cold Spring Harbor Laboratory Press, *Nature Struct. Biol.*, *Nucl. Acids Res.* and *Trends Biochem. Sci.*
- Invitations to lecture at international conferences: in particular, repeated invitations to the two primary meetings in this area of research, as follows:
  - Invited to all but one of the biannual FASEB meetings on “Nucleic Acid Enzymes” since their initiation in 1994: to present a lecture in 1994, 1996, 1998, 2000, 2002 and 2006, with a current invitation for 2010; to organise and chair the meeting in 2008. All at the Vermont Academy, Saxton’s River, Vermont, USA.
  - Invited speaker at every one of the triannual NACON meetings on “Nucleic Acid Recognition” since their initiation in 1989: namely 1989, 1992, 1995, 1998, 2001, 2004 and 2007 with a current invitation for 2010. All in Sheffield, UK.
  - Invitations to speak at other international meetings in Austria, Belgium, Eire, France, Germany, India, Hungary, Lithuania, the Netherlands, Spain and the USA. The latter included two medal lectures, the Invitrogen Lectures, to the Faculties of Biological Sciences and of Biomedical Sciences, University at Buffalo, New York, USA.

#### **SPECIAL AWARDS, HONOURS AND DISTINCTIONS**

2011: Foreign Member of the Lithuanian Academy of Sciences

2004: Elected Fellow of the Royal Society

2001: Novartis Medal and Prize. Awarded annually by the Biochemical Society “in recognition of outstanding contributions to the development of any branch of biochemistry”.

1998-2001 and 2001-2003: Wellcome Trust Research Leave Fellowships. These fellowships enabled me to focus exclusively on my research over these periods, during which the Wellcome Trust covered the salary for a replacement lecturer. The Department of Biochemistry appointed

first Dr Nigel Savery and then Dr Matthew Avison to this post. Both Drs Savery and Avison have since proceeded to permanent lectureships at this University, in the Departments of Biochemistry and Cellular and Molecular Medicine respectively

1992-1993: Royal Society Leverhulme Trust Senior Research Fellowship. Funds from the Leverhulme Trust covered my salary during this period, allowing me to focus solely on research, while the salary savings were used to appoint three post-doctoral Research Associates in the Department of Biochemistry to temporary lectureships for three months each.

### **PUBLICATIONS**

See attached list. <http://www.bris.ac.uk/biochemistry/people/stephen-e-halford/overview.html>

The information is based on a personal file.

Photo –<https://royalsociety.org/people/stephen-halford>

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