Prof. David Baulcombe
Emeritus Regius Professor of Botany, Cambridge University

Most important awards, prizes and academies

National Honour: Knight Bachelor, (Queens Birthday Honours list 2009). *Awards:* Sir Hans Krebs Medal and Lecture (2021) Federation of European Biochemical Societies; Mendel Medal (2017) Genetics Society; Prize Medal Lecture (2015) Society for General Microbiology; The McClintock Prize for Plant Genetics and Genome Studies (2014) Maize Genetics Executive Committee; Gruber Genetics Prize (2014) Gruber Foundation USA (shared with Ambros and Ruvkun); Balzan Prize (2012) (for epigenetics) Balzan Foundation, Rome; Wolf Prize for Agriculture (2010) Wolf Foundation Israel; Harvey Prize in Science and Technology (2009) Technion Israel Institute of Technology; Benjamin Franklin Medal in Life Science (2008) Franklin Institute, Philadelphia (joint with Ambros and Ruvkun); Special Achievement Award (2008) Miami Winter Symposium; Albert Lasker Award for Basic Medical Research (2008) Lasker Foundation (shared with Ambros and Ruvkun); Royal Medal (2006) The Royal Society; Massry Prize (2005) Massry Foundation – University of Southern California (shared with Fire and Mello); M.W. Beijerinck Virology Prize (2004) Royal Netherlands Academy of Arts and Sciences; Wiley Prize in Biomedical Science (2003) (Wiley Foundation – Rockefeller University – shared with Fire, Mello and Tuschl); Ruth Allen Award, American Phytopathology Society (2002); Kumho Science International Award in

Plant Molecular Biology and Biotechnology (2002) Kumho Cultural Foundation, Korea; Prix des Cerealiers de France (1990) for work on hormonally regulated genes of cereals. *Elected Fellowships:* Honorary Fellow (2020) Cambridge Philosophical Society; Honorary Fellow of the Royal Society of Edinburgh (elected 2015); Corresponding Member (2013) Royal Academy of Arts and Sciences Barcelona; Foreign Fellow (2011) National Academy of Science, India; Fellow of the Academy of Medical Sciences (elected 2010); Fellow, Trinity College Cambridge (elected 2009-2019 then Emeritus); Foreign Associate Member of the National Academy of Sciences (USA) (elected 2005); Honorary Professor, University of East Anglia (1998-2002); Academia Europaea, Member (elected 2002); Fellow of the Royal Society (elected 2001); European Molecular Biology Organisation, Member (elected 1997). *Academic Societies:* President Biochemical Society (Jan 2015-December 2017); President International Society for Plant Molecular Biology (2003-2006). *Honorary Degrees:* DSc (Hon) University of Leeds (2015); Honorary Doctorate University of Helsinki (2014); DSc (Hon) Edinburgh (2014); DL (Hon) Dundee (2014); DSc (Hon) University of East Anglia (2011); DSc (Hon) University of Birmingham (2011); Honorary Doctorate Wageningen Agricultural University (2008).

Summary of scientific research

Since 1973, when I started my research career, I have thought that one of the major challenges in biology is understanding of gene regulation in plants and animals. Genes are switched on and off during development and in response to the environment so that biology at molecular, organismal and population levels would be informed by knowledge about gene regulation. It has been the underlying theme throughout my research career. I work on plants but the general concepts and many of the mechanisms are common to all parts of the tree of life and my work has had impact in diverse areas including agriculture and biomedicine.

To begin with I focused on individual genes but advanced technology and computing now allows analysis of complex gene networks. This embracing of complexity means that molecular biology has moved beyond the phase of ‘stamp collecting’: the naming of parts in a cell. We can now begin to address the question of emergent properties in which cells and organisms are more than the simple sum of their parts so that molecular biology is truly ‘biology’. My group has become interested in epigenetics – the science of how nurture influences nature - and how environmental effects can be transmitted from one generation to the next.

Outside the laboratory I promote the use of plant biotechnology for crop improvement. I raised funds to endow a Professor of Crop Science and to support a new Crop Science Research Laboratory for the University of Cambridge. I am particularly interested in addressing developing country problems and in reducing the environmental impact of crops everywhere. A particular challenge is to ensure equitable use of new technology as part of holistic innovation of agriculture and food production systems.

Main publications

Shivaprasad, P.V., Dunn, R., Santos, B.A.C.M., Bassett, A. & Baulcombe, D.C. Extraordinary

transgressive phenotypes of hybrid tomato are influenced by epigenetics and small silencing RNAs. *EMBO J.* 31, 257-66 (2012); Shivaprasad, P.V. *et al.* A microRNA superfamily regulates nucleotide binding site-leucine-rich repeats and other mRNAs. *Plant Cell* 24, 859-74 (2012); Pretty, J. *et al.* The top 100 questions of importance to the future of global agriculture. *Int. J. Agric. Sustain.* 8, (2010); Mosher, R.A. *et al.* Uniparental expression of PolIV-dependent siRNAs in developing endosperm of Arabidopsis. *Nature* 460, 283-U151 (2009); Molnar, A. *et al.* Small Silencing RNAs in Plants Are Mobile and Direct Epigenetic Modification in Recipient Cells. *Science (80-.).* 328, 872–875 (2010); Herr, A.J., Jensen, M.B., Dalmay, T. & Baulcombe, D.C. RNA polymerase IV directs silencing of endogenous DNA. *Science (80-.).* 308, 118-120 (2005); Baulcombe, D. RNA silencing in plants. *Nature* 431, 356-363 (2004); Dalmay, T., Hamilton, A.J., Rudd, S., Angell, S. & Baulcombe, D.C. An RNA-dependent RNA polymerase gene in Arabidopsis is required for posttranscriptional gene silencing mediated by a transgene but not by a virus. *Cell* 101, 543-553 (2000); Voinnet, O., Pinto, Y.M. M. & Baulcombe, D.C.C. Suppression of gene silencing: a general strategy used by diverse DNA and RNA viruses of plants. *Proc. Natl. Acad. Sci. U.S.A.* 96, 14147-52 (1999); Hamilton, A.J. & Baulcombe, D.C. A species of small antisense RNA in posttranscriptional gene silencing in plants. *Science (80-.).* 286, 950-952 (1999); Ratcliff, F., Harrison, B.D. & Baulcombe, D.C. A similarity between viral defense and gene silencing in plants. *Science (80-.).* 276, 1558-1560 (1997); Li, H. *et al.* Induction and Suppression of RNA Silencing by an Animal Virus. *Science (80-.).* 296, 1319-21 (2002); Baulcombe, D.C. RNA as a target and an initiator of post-transcriptional gene silencing in transgenic plants. *Plant Mol. Biol.* 32, 79-88 (1996); Harrison, B.B.D., Mayo, M.M.A. & Baulcombe, D.C.D. Virus resistance in transgenic plants that express cucumber mosaic virus satellite RNA. *Nature* 328, 799-802 (1987).