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Personalia

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65th birthday of Edwin M. Southern, molecular biology and biotechnology mastermind

One of the greatest recognitions in science is to name a method after its inventor. Ed Southern was given such an honor: everybody working with nucleic acids is aware of Southern blotting and Southern blot hybridization [1]. Moreover, this name led to the 'geographical' nomenclature for other types of blotting (Northern, Western and Southwestern blots for RNA and protein identification).

Also, the original version of the technique that was used initially for DNA fragments only, has been extensively developed and adapted for other diagnostic applications; for example, dot or colony hybridization assays and electrophoretic transfer.

Seventeen years later, Southern and his team pioneered another extremely effective approach, oligonucleotide microarrays – also known as DNA chips – [2,3], which also represent one of the most powerful and widely used methodologies employed in molecular biology and genetics [4]. Furthermore, these arrays are extensively employed for expedite finding of antisense reagents in target validation studies [5–7]. Both these seminal techniques and their derivatives have led to significant research programs in different fields of biology, diagnostics and medicine, including early stages of the Human Genome Project.

Remarkably, Southern arrived at his significant anniversary with one more significant contribution: recently, together with co-workers, he introduced an innovative approach for the large-scale high-throughput preparation of a wide variety of siRNAs [8], a hot topic in the drug discovery arena at present.

Some other important biotechnology/diagnostics-related inventions, which Ed Southern and collaborators have contributed in the past 20 years, are also worth mentioning. It was he who pioneered a robust approach to the separation of large DNA molecules by pulsed-field

Edwin M. Southern

Famous British molecular biologist, biochemist and biotechnologist, Edwin Mellor Southern was born on 7 June 1938 in Burnley, Lancashire, UK. He finished Burnley Grammar School in 1954 and, at 16 years of age, started studying chemistry at the Manchester University. Eight years later, Southern obtained his PhD in Chemistry from Glasgow University and taught students as an Assistant Lecturer for one more year.

In 1963, Southern moved to ARC Low Temperature Research Station, Cambridge, UK, to work as a Research Assistant and in 1967, he joined the MRC Mammalian Genome Unit in Edinburgh in the same position; in 1980, he was appointed Director of this laboratory and Associate Director of MRC Clinical and Population Cytogenetics Unit.

Five years later, he moved to Oxford and was appointed Head of the Biochemistry Department at Oxford University (1985–1991); at present, Southern works there as Whitley Professor of Biochemistry and Director of the CRC Chromosome Molecular Biology Research Group. In 1995, he simultaneously became the Chairman/Director of Oxford Gene Technology (OGT; http://www.ogt.co.uk).

Southern was Visiting Professor at Nankai University in Tientsin, People's Republic of China (1982). He holds an Honorary Doctorate in Medicine and Surgery from Padua University (1988), as well as an Honorary DSc from Edinburgh University (1991), Lund University (1995) and Uppsala University (2003). In 1983, Southern was elected a fellow member of The Royal Society of London (British Academy of Sciences). He is also the Foreign Member of American Academy of Arts and Science (1988) and a member of Academia Europea.

Ed Southern is a recipient of various prestigious awards: the Biochemical Society BDH Gold Medal for Analytical Biochemistry (1981), Analytica Prize of the German Biochemical Society (1984), IBM Europe Prize for Science and Technology (1989), Gairdner Foundation International Award for Medical Science (1990), Royal Medal from The Royal Society (1998), CMB–Roche Award (1999), American Association for Molecular Pathology Award for Excellence in Molecular Diagnostics (1999) and Sir F.G. Hopkins Award/Medal (the British Biochemical Society; 2002).

E. M. Southern is the Founding Board Member of Human Genome Organisation (HUGO) and Founder and Chair of Kirkhouse Trust (research/education funding agency). He also serves the scientific advisor to IMMB (Heraklion, Greece) and Sanger Centre (Hinxton, Cambridge, UK).

The last stroke to Southern's brush is that he enjoys a spot of gardening and, rumour has it, he is quite a professional in this matter!

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gel electrophoresis directly after the emergence of this powerful technique [9]. More recently, Southern's team has developed, under his leadership, the original MS-encoding assay for combinatorial synthesis [10] and the innovative method of electrochemical deprotection for DNA array synthesis [11].

Being a gifted inventor, Ed Southern is also a bright scientist. He has contributed much to various fields of molecular biology and biochemistry. His research interests span from the studies of DNA thermo-ligases [12], oligonucleotide dendrimers [13], RNA folding [14] and radiation chemistry of proteins [15,16], to gene mapping and DNA analysis [17–23]. He is noted for his leading role in investigating the relationships between specific DNA sequences and their chromosomal structures and for studying the molecular basis of nucleic acid hybridization, which is fundamental to many processes and methods of molecular biology, biotechnology and DNA diagnostics.

Southern has published dozens of peer reviewed articles and has been granted several patents, including a portfolio of key US and European patents on oligonucleotide microarrays referred to, after their inventor, as the 'Southern patents' (registered in the 1980s). These are fundamental patents that cover the manufacture, use and sale of DNA chips. Although various biotech/pharma companies disputed these famous patents, they were successfully defended.

Southern's third entity belongs to the biotechnology business. In 1995, he founded Oxford Gene Technology (OGT; http://www.ogt.co.uk) to exploit patented technologies developed in his research laboratories at Oxford University. Today, OGT is best known for its powerful microarray technology but also holds fundamental patents in several other areas. The common link between them is that they are all related to 'molecular tools', which can be used to advance biological, pharmaceutical and medicinal R&D. OGT also serves as a 'head' company for some other businesses, including Tridend and Oxamer, which Ed Southern has recently organized.

Ed's 'star' jubilee coincides with the DNA 'golden' jubilee and, reflecting on the latter event, Southern reveals to us his wide vision of modern biology, biotechnology and drug discovery along with their relationships and prospects [24]. In recognition of his numerous achievements, Ed Southern is decorated with many domestic and international awards; the most recent one – the Sir F.G. Hopkins prize and a medal from the British Biochemical Society – was presented to him in December 2002 in London, UK. With this award he stays in one row with the famous Nobelists (and Sirs) Hans A. Krebs and John E. Sulston, the past recipients of Hopkins prize. I consider this as a clear indication that the titles 'Sir' and 'Nobelist' are soon expected for Edwin M. Southern too.

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