



OXSTEM



## Record £16.9m for Oxford spinout designing stem cell drugs to treat age-related disease

May 10 2016

One of the most ambitious Oxford spinouts to date is on route to becoming a powerhouse in age-related regenerative medicine, developing drugs which can treat cancer, neurodegenerative diseases, heart failure, macular degeneration and other major age-related conditions.

OxStem has raised a record £16.9m, and established strategic partnerships with world class biotechnology companies and individual investors in this rapidly emerging scientific space.

OxStem plans to develop small molecule drugs that can activate repair mechanisms that already exist within the body. Building on decades of experience in medicinal chemistry, OxStem will design drugs that can programme resident stem and stem-like cells *in situ* to treat currently untreatable age-related conditions.

In essence, OxStem seeks to switch on the body's natural regeneration and repair systems. Current stem cell treatments mostly focus on injection of cells into the body and are available only in hospitals with access to the specialist laboratory facilities needed to harvest, isolate and multiply stem cells. OxStem plans to reprogram stem and stem-like progenitor cells that already exist in the body with no need for cell transplantation procedures.

This will be the sixth spinout for OxStem co-founder Professor Steve Davies from Oxford's Department of Chemistry. Co-founders Professor Dame Kay Davies and Professor Angela Russell are also serial entrepreneurs with a number of drug-development spinouts to their names.

Professor Steve Davies said: "We will identify small molecule drug candidates, which can programme adult stem and stem-like cells to repair and replace tissues affected by disease or injury. We are tackling many of the worst conditions associated with ageing: dementia, heart failure, cancer and macular degeneration, which is the leading cause of blindness in the developed world." He added: "We have been very fortunate in being able to collaborate with some 80 University colleagues, all leaders in their respective fields, to match our insights and skills with their domain expertise to innovate clinical models and potential therapies. This is Oxford science at its best."

The funding will be used primarily for the development of pre-clinical small molecule drug candidates. "By developing drugs for this purpose we have the potential to revolutionise healthcare," said OxStem Chairman and CEO Dr. Michael Stein. "Our talented team is now going to be supported by a highly sophisticated investor base."

Dr. Stein continued, "Our Company is extremely fortunate to have the strategic backing of Human Longevity Inc. (HLI) and CEO Dr. J. Craig Venter, along with the team of Mr Bob Duggan and Dr. Mahkam Zanganeh (former CEO & Chairman and Chief Operating Officer respectively) of Pharmacyclics that was sold last year to Abbvie for US\$21 billion. Our other investors include a



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number of UK and international individuals as well as Oxford Sciences Innovation. What is common to all our investors is that they are all driven by the desire to support OxStem's world class medicinal science capabilities in its mission to positively impact millions of lives."

The Company's scientific advisory board, which is chaired by Professor Dame Kay Davies, will include Dr. Venter, who is best known for his seminal genomic sequencing work including sequencing the first human genome. Commenting on HLI's involvement with OxStem, Dr. Venter said, "Professor Steve Davies and his team are true visionaries in this field and have world class chemistry capabilities. HLI is eager to work with OxStem to jointly discover new classes of stem-cell based therapies to help enable a true era of personalised medicine".

Oxford's Isis Innovation supported the Company in preparing the spinout and commercialising the technology. Dr. Carolyn Porter, Deputy Head of Technology Transfer, Pharma and Biotech at Isis Innovation said: "This £16.9m funding – a record for a UK academic spinout – speaks to the enormous promise of OxStem".

OxStem will fund the development of a series of daughter companies - each with a focus on a different large unmet therapeutic need. The first of these companies is OxStem Oncology, which will investigate the potential for intervening in therapy-resistant cancers. The team will focus initially on Acute Myeloid Leukaemia and Myelodysplastic Syndromes with a view to expanding to other conditions over time. Plans are well advanced for the subsequent launch of OxStem Cardio, OxStem Neuro and OxStem Ocular to apply the stem cell technology to developing therapies for cardiac failure, neurodegenerative diseases, and macular degeneration.

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**About OxStem and Professor Steve Davies, Professor Dame Kay Davies, and Professor Angela Russell:**

OxStem was founded in 2014 by Professor Steve Davies, Professor Dame Kay Davies, Professor Angela Russell and a number of Oxford-based angel investors. OxStem is positioned to transform the field of medical therapeutics for what are typically (but certainly not exclusively) age-related conditions, such as Dementia, Heart Failure, Macular Degeneration (the leading cause of blindness in the developed world), Diabetes and Oncology.

OxStem is comprised of an internationally respected top tier scientific team with a strong track record in both translational bioscience and commercialising world-class scientific innovation.

The idea is straightforward: to use the Stem Cell and Medicinal Chemistry expertise within Chemistry and its associated partners at Oxford to identify new classes of drugs that can re-program or stimulate existing endogenous cells – awakening previously defunct or dormant cellular processes.

At present, most cell therapies are based on *in vitro* manipulation of the cells and transplantation into the patient. The OxStem hypothesis is that since the body has existing *in situ* adult stem and precursor cells, using high throughput phenotypic screens (based on cultures of tissue specific cells and targeted compound libraries), we can identify new classes of compounds that are able to stimulate these cells *in situ*.

For more information about OxStem please refer to: [www.oxstem.co.uk](http://www.oxstem.co.uk)

Key scientific reference: Davies, S. G.; Kennewell, P. D.; Russell, A. J.; Seden, P. T.; Westwood, R.; Wynne, G. M. *Journal of medicinal chemistry* 2015, 58, 2863.

Prof Dame Kay Davies obtained her BA in 1973 and D. Phil in 1976 from the University of Oxford. Kay is Dr Lee's Professor of Anatomy and Associate Head, Medical Sciences Division, University of Oxford, and Honorary Director of the MRC Functional Genomics Unit. Her research interests cover the molecular analysis of neuromuscular and neurological disease, particularly Duchenne Muscular Dystrophy. She has an active interest in the ethical implications of genetics research and the public understanding of science. She has considerable experience of biotechnology companies as a conduit for translating the results of experimental science into new therapeutics and diagnostics. She is a founding editor of 'Human Molecular Genetics' and a founding fellow of the Academy of Medical Sciences. She is a Fellow of the Royal Society (2003) and a Member of the European Molecular Biology Organization. Kay joined the Board of Governors of the Wellcome Trust in January 2008 and became Deputy Chair in 2013.

Kay has been a Dame Commander of the British Empire (DBE) since 2008, Commander of the British Empire (CBE) since 1996 and Fellow of the Academy of Medical Sciences (FMedSci) since 1998.



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Prof Steve Davies obtained his BA in 1973 and his D.Phil. in Chemistry in 1975 from the University of Oxford. He subsequently took up a University Lectureship in Chemistry and in 1996 became Professor of Chemistry (Oxford) and was elected to the Waynflete Chair of Chemistry in 2006, one of the most prominent academic posts in UK science. He has published >570 research papers, and his group has conducted investigations concerned with a huge array of topics, varying from organometallic chemistry and asymmetric synthesis to medicinal chemistry, and combinatorial synthesis. He has been the recipient of a variety of awards throughout his career, including the Hickinbottom Fellowship (1984), the Tilden Lectureship (1996) and the Royal Society of Chemistry Perkin Prize (2011).

Prof Davies has a strong track record in successful multidisciplinary research collaborations that multiplex chemistry, pharmacology and biology. Whilst remaining an active academic, Davies founded Oxford Asymmetry Ltd (an asymmetric synthesis company) in 1991 and Oxford Diversity Ltd in 1995 (a combinatorial chemistry company). These two companies were merged to form Oxford Asymmetry International Plc in 1999, which was sold to Evotec in 2000 for £316m. In 2003 he founded VASTox (Value Added Screening Technology Oxford), a zebrafish screening company. It floated on AIM in 2004 and changed its name to Summit plc in 2007. Summit raised £23m in a follow-on offering in 2014 in order to conduct phase 2 studies of a utrophin modulator in Duchenne Muscular Dystrophy and an in-licensed small molecule for the treatment of *Clostridium difficile*. Summit listed on NASDAQ in March 2015 raising an additional \$39m. It recently announced successful phase II results from the *C. diff* study with indications of superiority over the current standard of care, Vancomycin. In addition, Davies is founder and editor-in-chief for Tetrahedron: Asymmetry. Davies also founded OxRay Ltd, a crystallography software developer, and co-founded MuOx Ltd for drug discovery for orphan muscle diseases, as well as OxStem for regenerative medicine.

Prof Angela Russell gained her MChem degree from the University of Oxford in 2000 and her D.Phil. in Organic Chemistry in 2004 under the joint supervision of Steve Davies and Tim Perera from Yamanouchi plc (now Astellas Pharma Inc.). In March 2006 she became a Departmental Research Lecturer in Organic Chemistry and in July 2007 was awarded a prestigious Research Councils' UK Fellowship in Medicinal Chemistry jointly between the Departments of Chemistry and Pharmacology in Oxford. In 2012 she was appointed as University Lecturer, and in 2014 became an Associate Professor of Medicinal Chemistry. Angela's research interests broadly encompass the development of small molecules to control developmental processes. Angela has realized several successful multidisciplinary research collaborations, including identifying small molecules to upregulate utrophin for the treatment of Duchenne Muscular Dystrophy, developing novel inhibitors and activators of developmental signaling pathways and new anti-cancer agents. Since 2005 Angela has initiated a number of collaborative programmes involving the discovery and development of small molecules to manipulate stem cell fate. Angela's work has resulted in >60 publications and patent filings to date. In addition, Angela has co-founded two University spin out companies: MuOx Ltd in 2012, which was acquired by Summit plc in 2013, and OxStem Ltd in 2014.



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**About Isis Innovation:**

Isis Innovation is the research and technology commercialisation company of the University of Oxford. We provide access to technology from Oxford researchers through intellectual property licensing, spinout company formation and material sales, and to academic expertise through Oxford University Consulting.

Isis is the highest university patent filer in the UK and is ranked 1<sup>st</sup> in the UK for university spin-outs, having created over 110 new companies in 25 years. In the last financial year we completed 529 licenses and consulting agreements. Isis Enterprise, our innovation management consultancy, works with university, government and industrial clients from offices around the world.

Isis was named 'Technology Transfer Unit of the Year 2014' by Global University Venturing and in 2015 Isis Enterprise was awarded a Queen's Award for Enterprise (International Trade).

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