University of Birmingham

Professor Chris Bunce BSc PhD

Professor of Experimental Haematological Oncology

School of Biosciences (/schools/biosciences/index.aspx)

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About

Professor Chris Bunce Directs a translational research group dedicated to the development of novel therapies for leukaemias and lymphomas. A particular focus is the exploitation of drug redeployment strategies using off- patent drugs to provide affordable therapies that can be exploited by all including the worlds poorer nations.

Qualifications

BSc University of Birmingham

PhD University of Birmingham

Biography

Professor Chris Bunce is a double alumnus of Birmingham and has pursued his research career here too. His PhD studies were undertaken in the Dept of Immunology. In 1997 he was awarded one of two inaugural Leukaemia Research Fund Bennett Senior Fellowships which he took in the Department of Medicine.

In 2002 he moved to the School of Biosciences as a Leukaemia Research Fund Senior lecturer. In 2008 he became Reader in Experimental Haematological Oncology. Professor Bunce's group received Programme support from the Leukaemia Research Fund in 2005 which was successfully renewed in 2010. This programme is shared with Professor Bunce's long-term clinical collaborator Professor Mark Drayson.

Teaching

Professor Bunce directs the Undergraduate Human Biology Course and leads and teaches on a number of undergraduate and post graduate modules.

Postgraduate supervision

For a list of possible PhD projects offered by Professor Bunce **www.findaphd.com/search/customlink.asp?inst=birm-Biol&supersurname=Bunce (http://www.findaphd.com/search/customlink.asp?inst=birm-Biol&supersurname=Bunce)**

Research

Research Theme within School of Biosciences: **Molecular and Cell Biology (/research/activity/cellbiology/index.aspx)**

Translational leukaemia and lymphoma research

Exploitation of differentiation and apoptosis patways in the development of therapies for haematological malignancies

Improved chemotherapy and marrow transplantations have radically improved survival and cure rates in children and young adults suffering from leukaemia and lymphoma. However, as we get older our bodies become less able to withstand these therapies resulting in much poorer cure rates in older patients. For example median survival in acute myeloid leukaemia (AML), which is a disease predominantly of adults, remains less than six months.

Chemotherapy induces apoptosis of tumour cells via causing them physical damage. However, this damage is not restricted to the tumour cells resulting in systemic toxicity. We are trying to develop novel therapies that trigger apoptosis and/or differentiation in tumour cells using drugs that interact directly with these pathways and which do not directly damage cells. We are exploring avenues for exploiting the powerful anti-tumour activities of the cyclopentenone prostaglandin 15deoxy Delta $^{12,14}PGFJ_2$ in leukaemia cells. A central theme in the work is the exploitation of an enzyme of the aldo-ketoreductase family (AKR1C3). This enzyme indirectly prevents 15deoxy Delta $^{12,14}PGFJ_2$ synthesis. Our laboratory based studies have demonstrated that Inhibitors of this enzyme show anti-tumour activity against leukaemia and lymphoma cells. We are therefore investigating their activity in clinical trials.

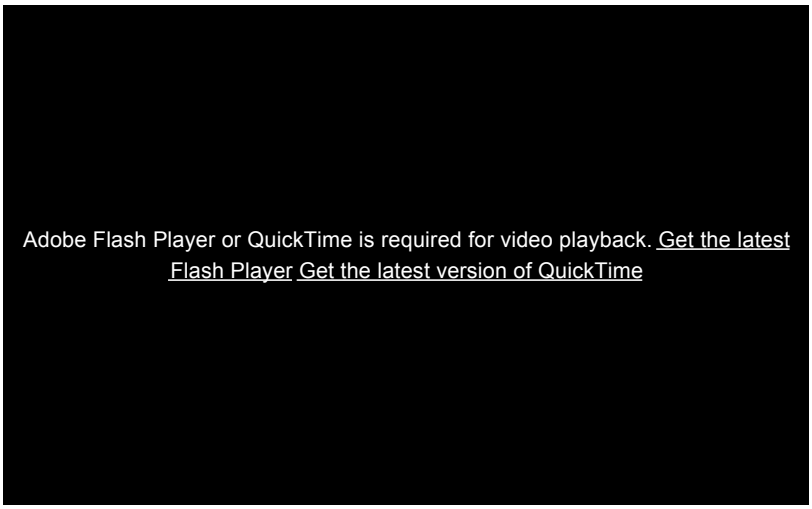
A particular focus is the use of old drugs for new diseases. New drug discovery progresses at a dismally slow pace and is phenomenally expensive, placing costly burdens on systems of health provision when they do arise and neglecting all but the richest nations. Drug redeployment endeavours to use relatively cheap available drugs and to use them in new ways. Our approach is to take drugs that are not considered as anti-cancer drugs and to use them in combinations that generate an anti-cancer effect. Our most advanced project is the use of the contraceptive drug medroxyprogesterone acetate combined with a cholesterol lowering drug Bezafibrate. This remarkable drug combination is now in clinical Trials for the treatment of AML here in the UK and in Burkitt lymphoma in Malawi.

Other activities

Professor Bunce is Director and founder of 'StemTrax' a spin out company developed to exploit recombinant Nm23 H1 protein in the provision of adult and embryonic stem cell mediated regenerative medicine (patent pending).

He is Reviewing Editor for PLoS One and a regular Reviewer of Papers for Blood, Cancer Research, Leukaemia, British Journal of Haematology and others. He also reviews a large number of Charity and Research Council Grant applications.

Professor Bunce sits on the steering committees of the University **Systems Science for Health** initiative (**www.ssfh.bham.ac.uk/ (http://www.ssfh.bham.ac.uk/)**) and on the Birmingham University Stem Cell Centre BUSCC (**www.stemcells.bham.ac.uk/ (http://www.stemcells.bham.ac.uk/)**).



Professor Mark Viant and Professor Chris Bunce discuss their work into the Systems Science for Health initiative within The College of Environmental and Life Sciences at The University of Birmingham.

Publications

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2. Hypoxia triggers major metabolic changes in AML cells without altering indomethacin-induced TCA cycle deregulation. Lodi A, Tiziani S, Khanim FL, Drayson MT, Günther UL, Bunce CM, Viant MR. ACS Chem Biol. 2010 Oct 1. [Epub ahead of print] PMID: 20886892
3. Lycorine sensitizes CD40L protected chronic lymphocytic leukemia cells to bezafibrate and medroxyprogesterone acetate induced apoptosis but dasatanib does not overcome reported CD40-mediated drug resistance. Hayden RE, Pratt G, Drayson MT, Bunce CM. Haematologica. 2010 95(11):1889-96.PMID: 20634492
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8. Visfatin induces oxidative stress in differentiated C2C12 myotubes in an Akt- and MAPK-independent, NFkB-dependent manner. Oita RC, Ferdinando D, Wilson S, Bunce C, Mazzatti DJ. Pflugers Arch. 2010 Mar;459(4):619-30. PMID: 19898975
9. Lack of functional and expression homology between human and mouse aldo-keto reductase 1C enzymes: implications for modelling human cancers. Veliça P, Davies NJ, Rocha PP, Schrewe H, Ride JP, Bunce CM. Mol Cancer. 2009 Dec 14;8:121. PMID: 20003443
10. Combined bezafibrate and medroxyprogesterone acetate: potential novel therapy for acute myeloid leukaemia. Khanim FL, Hayden RE, Birtwistle J, Lodi A, Tiziani S, Davies NJ, Ride JP, Viant MR, Gunther UL, Mountford JC, Schrewe H, Green RM, Murray JA, Drayson MT, Bunce CM. PLoS One. 2009 Dec 7;4(12):e8147. PMID: 19997560
11. Characterization of two novel aldo-keto reductases from Arabidopsis: expression patterns, broad substrate specificity, and an open active-site structure suggest a role in toxicant metabolism following stress. Simpson PJ, Tantitadapitak C, Reed AM, Mather OC, Bunce CM, White SA, Ride JP. J Mol Biol. 2009 Sep 18;392(2):465-80. PMID: 19616008
12. AKR1C isoforms represent a novel cellular target for jasmonates alongside their mitochondrial-mediated effects. Davies NJ, Hayden RE, Simpson PJ, Birtwistle J, Mayer K, Ride JP, Bunce CM. Cancer Res. 2009 Jun 1;69(11):4769-75. PMID: 19487289
13. Analysis of the role of COP9 Signalosome (CSN) subunits in K562; the first link between CSN and autophagy. Pearce C, Hayden RE, Bunce CM, Khanim FL. BMC Cell Biol. 2009 Apr 28;10:31. PMID: 19400951
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15. Metabolomic profiling of drug responses in acute myeloid leukaemia cell lines. Tiziani S, Lodi A, Khanim FL, Viant MR, Bunce CM, Günther UL. PLoS One. 2009;4(1):e4251. Epub 2009 Jan 22. Erratum in: PLoS One. 2009;4(4). doi: 10.1371/annotation/39584d38-04f5-4b37-bfd8-eae2318ec6f9. PMID: 19158949
16. Elevated FOSB-expression; a potential marker of valproate sensitivity in AML. Khanim FL, Bradbury CA, Arrazi J, Hayden RE, Rye A, Basu S, MacWhannell A, Sawers A, Griffiths M, Cook M, Freeman S, Nightingale KP, Grimwade D, Falciani F, Turner BM, Bunce CM, Craddock C. Br J Haematol. 2009 Feb;144(3):332-41. PMID: 19036090
17. Treatment of primary CLL cells with bezafibrate and medroxyprogesterone acetate induces apoptosis and represses the pro-proliferative signal of CD40-ligand, in part through increased 15dDelta12,14,PGJ2. Hayden RE, Pratt G, Davies NJ, Khanim FL, Birtwistle J, Delgado J, Pearce C, Sant T, Drayson MT, Bunce CM. Leukemia. 2009 Feb;23(2):292-304. PMID: 18923439