UCL Cancer Institute
Prospectus and Strategy 2013
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UCL Cancer Institute

UCL Cancer Institute and ‘UCL Cancer Domain’

The UCL Cancer Institute seeks to integrate basic, translational and clinical research. We are in a unique position to exploit the interdisciplinary nature of UCL by engaging engineering, physics, life sciences and nanosciences to transform cancer research. We will continue our programme of recruitment and fund raising, delivering our mission to:

- decrease the burden of cancer through laboratory and clinical research
- develop excellence, and place UCL as a major national and international hub for cancer research
- educate the next generation of cancer researchers and clinicians

To deliver this mission, we are:
- integrating basic and clinical cancer research across UCL and affiliated Hospitals
- expanding our laboratory and teaching spaces, accommodating an expanding Institute
- developing our core cancer strengths into centres of excellence (including Imaging; Cell Death and Inflammation; Genomics and Informatics; Stem Cells; Tumour Evolution; Lung Cancer*; Tumour Immunity and Immunotherapy)
- building on our successful postgraduate programmes including the ‘MSc Cancer’
- providing an integrated learning experience, with laboratory and clinical exposure to all our post-graduate and clinical PhD and trainee fellows
- expanding our biobanks, molecular pathology and genomics services (UCL-AD), supporting personalised cancer care
- recruiting international forefront researchers (clinical and non-clinical)
- increasing our industrial and philanthropic efforts, supporting infrastructure, recruitment and education

*linked to a Centre call by Cancer Research U.K.
Abbreviations

CIRT: UCL Cancer Institute Research Trust (registered charity number 1135220)
CCIC: Comprehensive Cancer Imaging Centre (CCIC)
CRF: Clinical Research Facility
ECMC: UCL Experimental Cancer Medicine Centre
GEE: UCL Research Department of Genetics, Evolution, Environment
GOSH: Great Ormond Street Hospital for Sick Children
HCA: Hospital Corporation of America
I&I: UCL Division of Infection and Immunity
ION: UCL Institute of Neurology
ICH: UCL Institute of Child Health
KCL: Kings College London
LMCB: MRC Laboratory for Molecular and Cell Biology
LCN: London Centre for Nanotechnology
NLCN: North London Cancer Network
IoWH: UCL Institute of Women’s Health
REF2014: Research Excellence Framework
RFH: Royal Free Hospital NHS Trust
SMB: UCL Research Department of Structural and Molecular Biology
SCRI: Sarah Cannon Research Institute (US)
SCR London: Sarah Cannon Research UK
UCLH: University College London Hospitals NHS Foundation Trust
UCL-AD: UCL Advanced Diagnostics

Background

The UCL Cancer Institute (www.ucl.ac.uk/cancer) is 5 years old. The Institute is located in the heart of London, and part of UCL [University College London]. UCL is consistently ranked within the top 20 global universities. The Cancer Institute is part of the Faculty of Medical Sciences (UCL School of Life and Medical Sciences). The Cancer Institute is the focus for cancer research at UCL, and other cancer activities across the campus are incorporated in the Cancer Domain (http://www.ucl.ac.uk/slms/domains/cancer) within the School of Life and Medical Science.

The Cancer Institute is affiliated with major teaching and specialist hospitals in London, including University College London Hospitals (UCLH); Royal Free Hospital; and Great Ormond Street Hospital for Sick Children. The Cancer Institute is also the nucleus for
the UCL Cancer Research UK Centre and the UCL Experimental Cancer Medicine Centre (ECMC). The Institute’s activities and space are spread across 5 buildings and 2 campuses, the Paul O’Gorman Building being the central research hub, with ~270 scientists studying basic and translational aspects of cancer research. The UCL Cancer Institute has 61 Group leaders, including 48 Faculty members (professorial, reader, and senior lecturers)(Faculty, Appendix 1). We have an additional 50 honorary clinical consultants and a total FTE staff number of 317. Across the new UCL Cancer Domain there are currently over 70 Group leads. Of the current Group leaders affiliated with cancer, there are 4 Fellows of the Royal Society, and 11 Fellows of the Academy of Medical Sciences. (Overall structure, Appendix 2)

Since 2009/2010, the number of enrolled postgraduate students has increased from 64 to 107 (PhD/MD/MB PhD students from 42 to 80) (Appendix 3), and the total number of Career Development Research Fellows (including clinical and non-clinical) from 6 to 15 (funded by MRC, CR-UK, Wellcome Trust, BBSRC, ERC and LLR). We have also significantly strengthened the foundations of basic cancer research at the UCL Cancer Institute by recruiting both internationally known scientists, as well as new group leaders with the potential to become international leaders in their respective fields.

Our total grant income has risen from £65 million in 2009, to over £105 million in 2012 (Appendix 4).

Trends in cancer research are steering our research strategy:

- Routine use of next generation sequencing for most research, with the associated computational infrastructure
- Focusing on experimental and more sophisticated models including ‘next generation’ transgenic, orthotopic and humanised mice
- Shifting from large randomized studies to smaller and more targeted clinical trials linked to translational studies
- Stratified and adaptive trials, incorporating tumour heterogeneity into translational studies
- Early phase studies exploring new targets from metabolic pathways, cell cycle and immunity
- Tumour immunology and vaccination

We will focus on strengthening our key areas of international competitive research, continue to build upon our core facilities and infrastructure, and support and mentor the newly recruited non-clinical and clinical researchers.
Summary of Major Strategic Aims for 2012

1. Major Initiatives

   1.1 Establishing a central bioinformatics facility (*Bill Lyons Informatics Centre*)
   1.2 Establishing *UCL/SCR Molecular Diagnostics Laboratory* at Shropshire House
   1.3 Core Grant Applications:
      - UCL Cancer Research UK Centre (Prof David Linch; renewal)
      - KCL/UCL Comprehensive Cancer Imaging Centre (CCIC)(Prof Tony Ng; renewal)
      - UCL Yale Cancer Immunity Centre (Wellcome Trust, new Application)
      - CR-UK Lung Cancer Centre Application
      - Samantha Dickson Brain Cancer Unit (renewal, The Brain Tumour Charity)
   1.4 Establishing the *Centre for Cell Death and Inflammation* (Prof Henning Walczak)
   1.5 Recruiting a Chair for Radiation Oncology, and establishing an Academic Unit for Radiation Oncology
   1.6 Prepare the business and philanthropic cases for the expansion of the Cancer Institute, to incorporate the Ear Hospital site.

2. Academic Recruitment and Appointments:
   - Head of Department of Oncology (with UCLH and RFH)
   - Head of Department of Pathology
   - Professor of Radiation Oncology (with UCLH)
   - Professor of Molecular Pathology
   - Professor of Urological Oncology (with UCLH and RFH)

3. Education:
   - Initiate new Masters Programme/Stream, linked to MSc Cancer
   - Establish an international CPD online course/module series
   - Establish mentoring programme for Clinician Scientists

4. Philanthropy:
   - Initiate new fundraising initiatives (with the UCL Cancer Institute Research Trust) for recruitment, equipment, personalised cancer medicine and new laboratory spaces and facilities

5. Web presence and Information:
   - Launch accessible web information of all clinical trials
   - Instigate a common webpage between SCR and CRF informing on all early clinical trial activities
   - Create a centralised system for selecting and updating UCL Cancer News
and Newsletter items (for Institute, BRC and Cancer Research U.K. Centre)
http://www.ucl.ac.uk/cancer/about_us/news

6. REF 2014
Finalise Cancer Impact Statements, and Selection of Staff and Publications for the Research Excellence Framework
(http://www.hefce.ac.uk/research/ref/)

7. Restructure professional services team

Cancer Types
Clinical and Translational Research is being conducted in all cancer types. However, a number of cancer types have been identified where we have, or will develop, international competitive programs in basic and translational research, underpinning large clinical trial activity, and international referral practices. For these cancer types our partner tertiary referral hospitals already have, or are aiming to establish, large referral practices.

For these tumour types, we are investing in biobanking matched with genotyping/genomics analysis, and access to infrastructure that will link molecular and genomics data with outcome/treatment response.
Diagram 1. Disease Site Based Research Strengths, and affiliated Hospitals. ‘London Cancer’ (UCLP), has not yet determined the tertiary referral centre/s for certain cancer types. Currently, pituitary neuroendocrine tumours are located at Barts; breast cancer at both Barts and RFH; head and neck cancer at both UCLH and Barts, and testicular cancer at Barts. It is likely that tertiary referrals for the common cancers, including lung, colo-rectal and gynaecological cancer, will remain at more than one site.

Infrastructure

A number of cross-cutting research Centres, Facilities and Themes support cancer research and facilitate cross-cutting collaborations.

- **UCL Cancer Research U.K. Centre** (Prof David Linch) This was the first CR-UK Centre to be established in London. It is an overarching Centre bringing together translational and clinical cancer research between UCL and partner hospitals UCLH, GOSH and RFH. The Centre provides a vehicle for CR-UK to invest in research, training and education at UCL and partner Hospitals.

- **UCL Cancer Research U.K. Trials Centre (CTC)**(Profs Jonathan Ledermann, Allan Hackshaw). The CTC is a Department within the Cancer Institute. It is the 2nd largest CTC in the U.K., coordinating national and international phase I-III cancer trials.
• **UCL Cancer Domain** Accommodates the interdisciplinary hub of cancer research at UCL, integrating cancer-relevant research with engineering, nanotechnology, physics and life sciences. The Domain also has representation from LRI and LSHTM, and will be in delivering UCL’s vision for the Crick Institute.

• **UCLP and London Cancer** (Profs David Fish and Kathy Prichard-Jones) UCLP brings together the largest Academic Health Science Centre in Europe, with an annual budget over £2 billion. The principal objective of London Cancer is to improve cancer outcome in North Central and East London, through earlier detection, improved cancer screening access, education, and access to clinical trials. London Cancer aims to establish a model clinical care provider network across Central, North and East London.

• **UCL Experimental Cancer Medicine Centre** (Dr Tim Meyer and Prof John Hartley) This Centre provides resources and infrastructure for drug development, early phase clinical trials and molecular pathology and diagnostics. A new 5 year programme was awarded by CRUK/Department of Health in 2011 with the UCL ECMC ranked 3rd in the UK.

• **UCL/UCLH and SCR UK Cancer CRF** (Dr Tim Meyer and Dr Tobi Arkenau) The UCL/UCLH Cancer CRF Facility is a physical and administrative entity, part of the NIHR UCLH CRF, and leads all early phase cancer clinical trials at UCL. The SCR UK facility (Harley Street, London) is a formal partner of our Cancer Institute and co-developing early phase clinical trials with the UCL/UCLH Facility. Five senior clinicians are currently dedicated to clinical trials at these Cancer CRFs.

• **UCLH/UCL Biomedical Research Centre** (BRC) Cancer is now established as one of four major programmes within the new BRC (Cancer, Prof David Linch; Dr Stephen Heggie, Manager, BRC Cancer). This programme will provide significant funds towards clinician research time, recruitment, clinical research infrastructure and translational studies.

• **Kings/UCL Comprehensive Cancer Imaging Centre** (Prof Tony Ng) Cross-cutting infrastructure and staff support for multimodality experimental and clinical imaging. This initiative is funded by an EPSRC_CR-UK Grant over 5 years.

• **UCL-AD** (UCL Advanced Diagnostics) UCL-AD is part of the UCL Cancer Institute and one of the largest pathology services providing specialist NHS services and research support (including HER2, KRAS, BRAF, EGFR and cKIT testing). The major strength of UCL-AD is high-throughput immunohistochemistry and FISH. The remit is being expanded to include molecular diagnostic tests for central and North London including to private patient providers.

Significant initiatives impacting cancer research at UCL:

- **UCH MacMillan Cancer Centre** (opened 2012)

This £100 million ambulatory Cancer Centre, opposite our main research facility in Huntley Street, is one of the U.K.’s largest and most advanced outpatient cancer care facilities. This is a 50 000 sq ft facility, with roof garden, dedicated clinical research and
imaging facilities including the first UK MRI-PET. The Centre provides significant opportunities to recruit patients to clinical studies, and to recruit top clinician-scientists to UCLH and UCL.

- **Proton Beam Treatment Centre** at UCLH

This is being co-developed with the Manchester site at the Christie Hospital as national referral centres. The Centre will provide significant opportunities for clinical research in paediatric, neuro-oncology, head & neck and sarcoma. This will also provide opportunities to expand physics and imaging research at UCL, including collaborations with KCL (Imaging) and Imperial (physics).

**Initiatives in 2013**

1) Establishing the ‘Bill Lyons Informatics Centre’

Camden Council approved the building of an extension on the eastern-side 6th floor of the POGB. We will create an Informatics Centre with space for up to 10 computational biologists, supporting high throughput genomics infrastructure, computational research and personalised cancer medicine.

The building costs will be approx. £850K. The UCL Cancer Institute Research Trust aims to raise £1,650,758 towards building and staff costs. The remaining £350,758 will be raised during 2013 towards this initiative.

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Building work for the Centre will commence in April 2013.
2) Establishing ‘UCL/SCR Molecular Diagnostics Laboratory’ at Shropshire House

UCL-Advanced Diagnostics is the diagnostic service arm of the UCL Cancer Institute. The current turnover for UCL-AD is approx. £2 million/annum.

Over the past year, UCL-Advanced Diagnostics undertook a comprehensive assessment program looking at the viability of Next Generation Sequencing (NGS) technology to enable multiplexed molecular profiling. In conjunction with internally developed bioinformatics systems and extensive validation against known mutations detected using existing validated technology, UCL-AD is to make available a complete, integrated, NGS based, mutation analysis panel assay for use on formalin fixed, paraffin embedded material.

On launch in Q1 2013 this assay will consist of all of the targets currently assigned to the CR-UK stratified medicine program including all actionable cancer mutations for therapeutics with European Medical Agencies Approval and NICE re-imbursement. The additional, prominent cancer targets within the assay also make available to the oncology community potential entry into a significant number of targeted clinical trials. Q2 2013 will see the expansion of this assay to include a comprehensive expanded 35-gene panel.

We are currently in the final stages of negotiation with HCA for the opening of the UCL/SCR Molecular Diagnostics Laboratories in Shropshire House (GLP laboratories), to expand this service and to develop exome sequencing for patients in clinical studies. This will provide an additional 3620sqft space for the Institute, and as well as over GBP1.5 million upfront investments from HCA.

Leads:
Michael Gandy, Lead BMS/Clinical Services Manager; Prof Adrienne Flanagan

3) Core Grant/Centre Applications:

⇒ UCL Cancer Research UK Centre (Prof David Linch)
   Renewal to be submitted Q3 2013. This will be an opportunity to assess the current core funded positions, and to provide support for core resources, e.g. FACS, microscopy and genomics.

⇒ KCL/UCL Comprehensive Cancer Imaging Centre (CCIC)(Prof Tony Ng)
Renewal interview in January 2013.

⇒ UCL/Yale Cancer Immunology Centre (Wellcome Trust, new Application)  
Pre-application will be submitted in March 2014. This will be for a £4-5 million application, supporting tumour immunology between UCL and Yale.

⇒ CR-UK Lung Cancer Centre Application  
Pre-application will be submitted in March 2013. This will be a joint UCL/Manchester bid. Tumour heterogeneity and evolution will be a central theme for this application (Prof Charlie Swanton).

⇒ Samantha Dickson Brain Cancer Unit (renewal, The Brain Tumour Charity). Prof Paolo Salomoni and Dr Steven Pollard, application Q2 2013.

4) Establishing the Centre for Cell Death and Inflammation (Prof Henning Walczak)

The recruitment of Henning Walczak provides the opportunity to build proteomics research and infrastructure at the Cancer Institute. Prof Walczak will develop a Centre focused on tumour inflammation and cell death, recruiting new staff, initiating a pan-London seminar series, and building research strengths in lung and ovarian cancers.

5) Recruiting a Chair for Radiation Oncology, and establishing an Academic Unit for Radiation Oncology

The UCLH Proton Beam Treatment Centre will be developed in close proximity to the Cancer Institute and UCH Macmillan Cancer Centre. UCLH will be running an integrated radiotherapy service with direct access to the Trust’s existing Radiotherapy Department. The Centre will consist of a proton source, beam transport system, and rotational gantries for up to four treatment rooms. The exact specification of technology and vendor will be finalised over the next 12 months.

The Centre will increase significantly our research and clinical care capabilities for paediatric and neuro-oncology, sarcoma, and other selected malignancies. The joint service with the Christie Hospital in Manchester will offer the main high energy PBT service in the UK, allowing unparalleled access for patients and their families from all over the UK. Around 1,500 patients/annum will be treated with PBT.

Significant opportunities exist for research collaborations across UCL, including with Medical Physics and Bioengineering; Imaging; London Centre for Nanotechnology (LCN); and Engineering.

We are working with Perrett Laver to identify potential international candidates to lead academic radiation oncology and proton beam treatment research at UCL and
UCLH. Additional posts are available to be appointed by the Chair, including at least three clinical senior lecturers in radiation/clinical oncology.

Funding for this initiative: UCLH/UCL BRC; UCL CR-UK Centre, UCLH and UCL.

6) Prepare the business and philanthropic cases for the expansion of the Cancer Institute, to incorporate the Ear Hospital site.

UCL and UCLH aim to become an international leader in cancer research and delivery. The UCL Cancer Institute is the hub for cancer research at UCL.

Globally, major Cancer Institutes around the world are expanding their research infrastructure and capabilities, adapting to the global increased burden of cancer due to an ageing population, and the demand from industry to concentrate complex early phase clinical studies with translational research at centres of excellence. The top 10 cancer centres in the US, and top 8 cancer centres in Europe, are all supported by over >750 laboratory and clinical cancer scientists, with significant critical mass in both clinical and applied translational cancer research capabilities.

During the last decade, the incidence of cancer in the U.K. has increased from 30% to nearly 45%. With the ageing population, it is estimated that 1 in 2 individuals will develop cancer by 2025. The opening in 2012 of the new UCH Macmillan Cancer Centre will significantly expand the outpatient care capabilities at UCLH, providing an opportunity to increase patient numbers during the next decade.

The UCL Cancer Institute, Huntley Street has now reached full capacity. We will require significant more space for GCLP and CPA accredited laboratories, supporting clinical trials, development of genomics laboratory for stratified/personalised medicine,
space to build capacity for cancer-related radiation and computational sciences, and laboratory space to take advantage of advances in nanotechnology and engineering, to translate this knowledge into innovative cancer drug delivery, gene therapy and biomarker platforms.

The ‘Huntley street campus’, encompassing the POGB, UCH Macmillan Cancer Center, UCLH/UCL Clinical Research Facility at the UCH Elizabeth Garrett Anderson wing, Proton Beam Treatment (PBT) Centre, and Ear Hospital/Cancer Institute, will create a world-class ‘cancer campus’.

A Research Facility was designed by Ian Richie Architects for a 9400 m² Sainsbury/Wellcome Centre on the Ear Hospital site (The Sainsbury Wellcome Centre for Neural Circuits and Behaviour is now being completed in Cleveland Street). The proposed building was approved by Camden Council Development and Planning in 2010.

The proposed laboratory, seminar and office spaces for the Cancer Institute expansion could include:

1. Centre for Cancer Evolution and Stem Cell research (1000 m²)
2. Leukaemia and Gene Therapy Laboratories (1000 m²)
3. Expansion of the London Centre for Nanotechnology, for research supporting cancer drug delivery systems, and novel methods for cancer biomarker detection and quantification (1000 m²)

4. Experimental models (including innovative new cancer models, e.g. humanized mice) for drug testing, and growing xenographs directly from patient’s tumours for biomarker discovery and drug sensitive screening (1000 m²)

5. Cancer Informatics, Biostatistics and Computational Biology, supporting clinical trials, personalised medicine, whole genome sequencing (400m²)

6. Radiation Oncology (1000m²)

7. Cancer Inflammation and Cell Death Centre (1000 m²)

8. Cancer Outcome Research and Administrative Offices (UCH and UCLH)(1000 m²)

9. Seminar rooms, Teaching and Research Offices (UCL and UCLH)(2000 m²)

Further Plans and Aims

1. Education

During 2012 we established a highly successful mentoring programme for non-clinical research fellows (Prof Tariq Enver).

- Establishing a Mentoring Group for clinical researchers (senior and honorary Clinical Lecturers, time scale Q1 2013)

We have an established Masters programme in cancer biology & medicine (MSc Cancer).

- Explore the opportunities for two potential new masters programmes or streams associated with MSc Cancer (cancer nursing and cancer genomics) (time scale 2013). We should aim to the total number of MSc students to >40/annum over the next 2 years.

With Apollo Group’s Medvarsity platform we are planning to develop continuing professional development modules for health professionals in Southeast Asia (time scale 2013)

- Establish international CPD online course/module series
- Explore opportunities for our MSc in India, e.g. with a Centre visited by Cancer Institute Faculty, The Gujarat Cancer & Research Institute, Ahmedabad, India
- During 2013/2014 we will also generate a ‘UCL Cancer’ weblink with the complete required undergraduate (MB BS) cancer curriculum.
2. Philanthropy

Working with the Cancer Institute Research Trust, UCL Development Office, UCLH Charity, RFH Charity, or with Queen Square Charities to increase philanthropic giving.

Areas for funding will include the Informatics Centre, recruitment of new clinical and non-clinical researchers, major equipment, personalised cancer medicine infrastructure and sequencing capability (incl Centre for Tumour Evolution), and new laboratory facilities (incl new Ear Hospital site).

3. Web presence and Information

- Launch an accessible web page, linked to our new website (www.ucl.ac.uk/cancer), containing in an accessible format information of all open clinical trials, including a single site between SCR and CRF for early clinical trials
- Create a centralised system for selecting and updating UCL Cancer News and Newsletter items
  http://www.ucl.ac.uk/cancer/about_us/news
  http://www.ucl.ac.uk/cancer/about_us/newsletter

4. REF 2014

REF2014 will be a major priority for the Institute, as this will generate investment in HEFCE-funded staff, supporting the significant expansion of the Institute during the past 3 years. The REF2014 strategy will be linked to the recruitment of new staff during 2012. The UCL Cancer Institute will submit ~55 HEFCE-supported staff towards the research excellence framework (Unit of Assessment: Clinical Medicine).

- Finalise Impact Statements, selection of staff and Publications for the Research Excellence Framework (http://www.hefce.ac.uk/research/ref/)

5. Restructure professional services

Currently the UCL Cancer Institute and Wolfson Institute for Biomedical Research share an administrative team. The Cancer Institute will establish a separate professional services team during 2013 (Q1/2).

6. Initiatives supporting the UCL Medical School

Formulate the strategy of UCL for the Crick Institute, and recruit potential joint appointments with LRI
Cancer Institute Structures, Symposia and Seminars

- Cancer Institute Executive Board
- Education Committees
  - Undergraduate
  - Postgraduate
- Safety Committee
- Seminar Committee
- Annual Cancer Institute/CR-UK Centre Conference Committee
- Management Group
- AthenaSwan Committee
- Core Facilities Group
- Operations Group (professional services only)

Regular Meetings/Symposia and Conferences

Research-In-Progress Meetings (weekly, Pablo Rodriques-Viciana)

Mentoring workshop (monthly, Tariq Enver)

microRNA Symposia (Annual)

Cancer Immunology Seminar Series (monthly, pan-London, Sergio Quezada and Clare Bennett)

Glioma Club (quarterly, pan-London, Paolo Salomoni)

Cancer Institute Annual Symposium/ CR-UK Centre Conference

Cancer Institute Research Trust

Registered Charity 1135220

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<tr>
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<th>Position/Role</th>
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<tr>
<td>Richard Sutton-Mattocks</td>
<td>Chairman</td>
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<tr>
<td>Giles Andreae</td>
<td>Giles is an internationally renowned children’s author and the creator of cartoon characters Purple Ronnie and Edward Monkton.</td>
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<tr>
<td>Jeremy Bailey</td>
<td>Chartered Accountant, Chairman of Global Banking Europe at Deutsche Bank, AG.</td>
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<tr>
<td>Bob Boas</td>
<td>Corporate Finance banker with SG Warburg &amp; Co for thirty years. Chairman of London String Quartet Foundation.</td>
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<tr>
<td>Karen Bullivant</td>
<td>Previously Marketing Director at The London Clinic</td>
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<tr>
<td>Jeremy Loyd</td>
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<tr>
<td>David McCaig</td>
<td>Managing Director &amp; Global Head of Asset Securitisation at Standard Bank, Plc.</td>
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<td>Lady Sassoon</td>
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</table>
Important discoveries from our researchers that had global impact, include:

- Identifying the best chemotherapy combination for advanced gall bladder and bile duct cancer. The ABC02 trial, was run by the Cancer Research UK and UCL Trials Centre (N Engl J Med. 2010 Apr;362(14):1273-81)
- Discovered that viruses exploit tiny molecules derived from human DNA called microRNAs, to make cells more susceptible to viral infection, that can lead to cancer development. MicroRNAs are mostly found in parts of the human genome which do not generate proteins – initially thought to be ‘junk DNA (Nature Cell Biol. 2010 May;12(5):513-519)
- Discovered a way of improving the effectiveness of bone marrow transplantation, a key treatment for many patients with blood cancer, by providing an extra ‘boost’ to the immune system. Bone marrow transplants from a healthy donor provide the patient with a new bone marrow, but also a new immune system. This means that immune cells from the donor can attack the blood cancer, an effect called the ‘graft-versus-leukaemia’ effect. Scientists showed that cancer-targeting immune cells can become ‘worn out’ and stop working. Importantly, a new treatment can revive the ‘tired’ immune cells and get them to start working again (J Clin Invest. 2010 Nov;120(11):3855-68)
- Developed new protocols to boost the immune system to target cancer. With colleagues at the Memorial-Sloan Kettering Cancer Center (NY), discovered how a new therapeutic antibody, targeting anti-CTLA4 (CTL-associated antigen 4) results in enhanced anti-tumour T cell function and inhibition of the immune dampening T-regulatory cells (T-reg). Discovered the role of a specific immune cell, called CD4+ T cells, and how to expand these CD4+ T cells with a therapeutic, called anti-CTLA4 (CTL-associated antigen 4), to increase antitumor activity against advanced melanoma in an experimental model. This work has significant implication for how to harness the immune system, to treat human cancer (J Exp Med. 2009 Aug 3;206(8):1717-25; J Exp Med. 2010 Mar 15;207(3):637-50.)
- Discovered, with colleagues from the Institute for Cancer Research, the genetic architecture of acute leukaemia. Specifically showing that leukaemia-causing cells and the cells derived from them are not all genetically similar. Leukaemia cells evolve by which different subclones emerged and the ongoing dynamic changes is associated with relapse. The study offers a plausible explanation for why advanced cancer is so difficult to treat, when the very cells that trigger the disease is itself genetically diverse and a moving target (Nature. 2011 Jan 20;469(7330):356-61)
- Discovered the genetic abnormality driving rare forms of diseases involving bone, known as Ollier disease or Maffucci syndrome. These diseases are characterised by multiple bone tumours. The genetic abnormality (mutation), which the research group has identified, that drives the growth of these tumours are found in the gene isocitrate dehydrogenase (IDH 1). The mutations are acquired early in the developing embryo which explains the distribution of multiple tumours in different tissues in the body. The research also explains the rare occurrence of a subtype of brain tumour, and leukaemia in patients with Ollier disease and Maffucci syndrome, as these two tumour types are also known to carry IDH1 mutations (Nature Genet. 2011 Nov 6;43(12):1262-5)
- Discovered the prognostic implications of various genetic faults in acute myeloid leukaemia (AML). Specifically, show the prognostic relevance of detecting genetic abnormalities (mutations) in the genes called CEBPA FLT3, IDH1/2 and NPM1 in AML. This work has major implications for stratifying patients with AML to various therapeutic strategies, including targeted therapy and bone marrow transplantation (J Clin Oncol. 2010 Jun 1;28(16):2739-47; Blood. 2011 Jul 14;118(2):409-12)
- Demonstrated the first unequivocal evidence of successful gene therapy for hemophilia B — a major advance in this field. The research was conducted in collaboration with St Jude’s Children’s Hospital. This gene therapy trial for hemophilia B is truly a landmark study, since it is the first to achieve long-term expression of a blood protein at therapeutically relevant levels. If further studies determine that this approach is safe, it
may replace the cumbersome and expensive protein therapy currently used for patients with hemophilia B (N Engl J Med. 2011 Dec 22;365(25):2357-65)


- Conducted the first genome-wide analysis of the genetic variation between different regions of the same tumour using samples of kidney cancer. This work revealed that genetic faults were not repeated across other biopsies from the same tumour, revealing an extraordinary amount of genetic diversity, with more differences between biopsies from the same tumour at the genetic level than there are similarities. The findings help to explain why personalised cancer treatments based on biomarkers from tumour biopsies are not always successful, and have important implications for developing new targeted cancer therapies (N Engl J Med. 2012 Mar 8;366(10):883-92)

- Discovered that an experimental drug, olaparib, might have a role to play in ovarian cancer. Olaparib belongs to a group of anti-cancer drugs called PARP inhibitors. Results lead from a phase 2 trial led by UCL have shown that it significantly prolonged progression-free survival in patients with platinum-sensitive relapsed ovarian cancer. Patients who received olaparib as maintenance therapy achieved a progression-free survival that was nearly 4 months longer than those who received placebo. This is the first randomized trial to demonstrate the benefits of a PARP inhibitor as maintenance therapy in relapsed serous ovarian cancer, which is the most common form of this disease (N Engl J Med. 2012 Mar 27)

- Inflammation is an important component of tumours. Discovered the mechanism how inflammation is regulated. Specifically, showed how members of the tumour necrosis factor (TNF) receptor superfamily functions in immunity and inflammation. This work was the first to provide evidence for the relevance of linear ubiquitination in vivo in preventing inflammation and regulating immune signaling. (Nature. 2011 Mar 31;471(7340):591-6).
## Appendix 1
Faculty (Senior Lecturer, Reader, Professorial)

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<th>Group Leaders, Career Development Fellows, and Independent Investigators</th>
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<td>Gewinner, Christina</td>
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### Appendix 2  UCL CANCER INSTITUTE STUDENTS

#### Institute Student Numbers by Degree/Field of Study/Fee Status

**2010-2011**

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<th>Degree/Field of Study</th>
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<th>Overseas</th>
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**2011-2012**

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<td>MD(Res) Clinical Research</td>
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Appendix 3
Appendix 4

Total current Grant Income

2011/12

£ 105 million

- CR-UK
- LLR
- MRC
- Wellcome Trust
- EU
- Samantha Dickson
- Lymphoma Research Trust
- BBSRC / EPSRC
- Industry
- Other grant income

Other grant income include AICR, Breast Cancer Campaign, Brit Soc for Haematology, Butterfield Trust, Children with Cancer, Chordoma Foundation, Kay Kendall Leukaemia Fund, Sackler Foundation, Rosetrees Trust, Skeletal Cancer Action Trust, SARC, Wolfson Foundation, UCL Cancer Institute Research Trust