UCL Cancer Institute
Strategy for 2012
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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 will continue to:
- integrate basic and clinical cancer research across UCL and affiliated Hospitals
- expand our laboratory and teaching spaces, accommodating an expanding Institute
- develop our core cancer strengths into centres of excellence
- build on our successful postgraduate programmes including the ‘MSc Cancer’
- provide an integrated learning experience, with laboratory and clinical exposure to all our post-graduate and clinical PhD and trainee fellows
- further expand our biobanks, molecular pathology and genomics services (UCL-AD), supporting personalised cancer care
- significantly increase our industrial and philanthropic efforts, supporting infrastructure, recruitment and education
Abbreviations

CIRT: UCL Cancer Institute Research Trust (registered charity number 1135220)
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
LMCB: MRC Laboratory for Molecular and Cell Biology
Nano: London Centre for Nanotechnology
NLCN: North London Cancer Network
IoWH: UCL Institute of Women’s Health
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 Hospital NHS Foundation Trust
UCL-AD: UCL Advanced Diagnostics

Background

The UCL Cancer Institute (www.ucl.ac.uk/cancer) 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. The Cancer Institute hosts the majority of cancer research at UCL and other significant 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 a number of teaching and specialist hospitals in central London, including University College London Hospital (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 50 scientific Group leaders, 32 clinical scientists, 50 honorary clinical consultants and a total FTE staff 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 10 Fellows of the Academy of Medical Sciences.

During the past 3 years the number of enrolled postgraduate students has increased from 75 to 105, 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. Particular areas of strengths include stem cell biology, transcription, cell cycle, translational immunology, genomics (including epigenetics) and bioinformatics, and mechanisms of chromatin regulation. Additionally, a number of cancer researchers were recruited to the Faculty of Life Sciences, but are affiliated with the Institute, together with established basic researchers at the LMCB.

Our current total grant income has risen to over £85 million from £65 million in 2009. Trends in cancer research will also steer 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. Recruitment and Appointments:
   Head of Department of Oncology (with UCLH and RFH)
   Professor of Haemophilia (with RFH)
   Professor of Radiation Oncology (with UCLH)
   Senior Group Leader Cancer Research
   Senior Group Leader Cancer Research

2. Bioinformatics and Genomics:
   Tender and fundraising for Informatics Centre
   Recruitment of computational biologists
   Establish UCL-AD genomics service
   Establish lung and head & neck cancer recurrent disease tumour bank

3. Education:
   Initiate new Masters Programme
   Establish an international CPD online course/module series
   Establish mentoring programme for Clinician Scientists

4. Philanthropy:
   Initiate major fundraising efforts for Informatics Centre, recruitment, equipment, personalised cancer medicine and new laboratory 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
   http://www.ucl.ac.uk/cancer/about_us/news

6. REF 2014:
   Finalise Impact Statements and Selection of Staff and initial Publications for the Research Excellence Framework
   (http://www.hefce.ac.uk/research/ref/)
**Update on 2011 Action Plans**  (in bold Aims as identified in January 2011)

**Recruitment of Chair in Molecular Pathology and Personalised Cancer Medicine**

⇒ Appointed Professor Charlie Swanton. He will focus research efforts on the expansion of clinical trials where tumour genotype informs patient stratification (molecular directed clinical trial design/personalised medicine studies)

**Recruitment of Chair in Radiation Oncology (with UCLH)**

⇒ We delayed this recruitment, partly due to government paucity in announcing their commitment to proton beam treatment. We have since identified a potential candidate, and should make an appoint with UCLH during 2012

**Increase postgraduate student numbers by 20%**

⇒ We have increased PhD student numbers by 15%

**Co-development of the Clinical Fellows (clinical PhD) program and recruitment process with LRI**

⇒ Initiated and ongoing programme (lead by Prof David Linch and Dr Sally Leavers, Academic Director, LRI)

**Establishment of mentoring program for new Clinical Senior Lecturers and Research Fellows**

⇒ We have established a mentoring programme for non-clinical research fellows (Chair Prof Tariq Enver, supported by Dr Julia Cooper, LRI; Prof Daniel Hochhauser and Prof Dan Cutler, LMCB)

**Development of additional space for Molecular Pathology and Genomics (UCL-AD)**

⇒ Space identified and contracts to be signed between UCL and HCA, lower ground floor, 400sqm, Shropshire House, Capper Street

**Increase Philanthropic Funding by 30%**

⇒ CIRT funding increased by over 200% during 2011 (supported by the DebbieFund, ICAP, ‘Mothers and Daughters’ and CureCancer@UCL)

**Launch new website and newsletters**

⇒ New website launched September 2011 (Lead, Dr Berend Tolner);
⇒ First two newsletters published (Lead, Dr Denise Beales) Spring 2011 [http://www.ucl.ac.uk/cancer/about_us/about_us_docs/spring_2011.pdf](http://www.ucl.ac.uk/cancer/about_us/about_us_docs/spring_2011.pdf)
⇒ Autumn 2011 [http://www.ucl.ac.uk/cancer/about_us/about_us_docs/Newsletter_ISSUE_2_Autumn_2011.pdf](http://www.ucl.ac.uk/cancer/about_us/about_us_docs/Newsletter_ISSUE_2_Autumn_2011.pdf)
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, the largest referral practices in London.

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

During 2012 we will expand this portfolio with **GI & Hepatobiliary Cancer** (with hepatobiliary a potential national center of excellence; RFH) and **Head and Neck Cancer** (with head & neck sarcoma and future proton beam therapy leading national activity; UCLH). These will require strategic leadership, as well as academic and clinical alignment of aims.

Infrastructure

A number of cross-cutting research Centres, Facilities and Themes support cancer research and facilitate cross-cutting collaborations.
• **UCL Cancer Research UK Centre** (Prof David Linch) This was the first CR-UK Centre to be initiated in London. This is the overarching Centre bringing together translational and clinical cancer research between UCL, and partner hospitals UCLH, GOSH and RFH. This Centre provides the vehicle for CR-UK to invest in research, training and education at UCL and partner Hospitals.

• **UCL Cancer Research UK Trials Centre** (CTC, Prof Jonathan Ledermann) This is one of the largest Trials Units in the U.K., and a Department within the Cancer Institute. With over 80 staff, the CTC offers know-how to local investigators, hosting a large number of UCL-led trials, and represents UCL at a national and international level for trials design and execution.

• **UCL Cancer Domain** Accommodates the interdisciplinary of cancer research at UCL, integrating cancer-relevant research from engineering, nanotechnology, physics and life sciences. The Domain also has representation from LRI and LSHTM, and is a key vehicle to deliver 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. 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 the resources and infrastructure for drug development, early phase clinical trials, GCLP pharmacokinetic and pharmacodynamics analysis, molecular pathology and diagnostics. A new 5 year programme was approved in 2011 with the UCL ECMC ranked within the top tier of Centres 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 structure, part of the UCL/UCLH CRF, and leads all Phase 0/I 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 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. 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, Kings; Prof Richard Begent, UCL) 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. Their remit is being expanded to include molecular diagnostic tests for central and North London, including to our private partners (HCA and The London Clinic).

Significant initiatives impacting cancer research at UCL:

1. **UCH MacMillan Cancer Centre** (opening April 2012)

This £100 million ambulatory Cancer Centre, opposite our main research facility in Huntley Street, will be the UK’s most advanced out-patient cancer care facility. This is a 50 000 sqft facility, with roof garden, dedicated clinical research and imaging facilities including the first UK MRI-PET.

2. **Proton Beam Treatment Centre** at UCLH (with UCLP).

This is being co-developed with the Manchester facility as national referral centres. This Centre will build on our clinical research strengths in paediatric, neuro-oncology, head & neck and sarcoma. This will also provide opportunities to expand physics and imaging research at UCL, including collaborations with Kings (Imaging) and Imperial (Physics).

**Strategic Aims for 2012**

1. **Recruitment and Appointments**

   - Head of Department of Oncology (with UCLH and RFH)

     Identify and recruit an international leader in cancer medicine to lead the academic and education mission of the Department of Oncology (time scale 2012/2013). This is the replacement for Prof Richard Begent.

     - Professor of Haemophilia (with the Haemophilia Centre at the RFH)

     Finalise job description, business plan and advertisement to appoint a Chair of Haemophilia at UCL and the RFH. This is the recruitment of a replacement for Prof Ted Tuddenham (Emeritus Professor, UCL Cancer Institute) and will build on the international research strengths, e.g. gene therapy, of this Centre (time scale early 2012).
Finalise job description, business plans and advertisement to appoint a Chair in Radiation Oncology at UCL and UCLH (time scale early 2012).

- Professor of Radiation Oncology (with UCLH)
- Senior Group Leader Cancer Research
- Senior Group Leader Cancer Research

To appoint two internationally recognised senior group leaders in cancer biology, strengthening the senior faculty of world-renowned cancer researchers at UCL. These are strategic positions to strengthen the mentoring of junior group leaders, the impact of fundamental and translational cancer research at the Institute, to further raise the national and international profile of cancer research at UCL. Areas of research could include genomics, metabolomics, immunology or signaling.

2. **Bioinformatics and Genomics**

Camden Council approved the building of an extension on the eastern-side 6th floor of the POGB. The plan is to create an Informatics Centre with space for up to 8 additional computational biologists, supporting high throughput genomics infrastructure, computational research and personalised cancer medicine.

- Tender and fundraising for Informatics Centre (estimated cost £915K, 2012)
- Recruitment of computational biologists (2012/2013)

Establishing the UCL-AD genomics and molecular pathology research and clinical service in Shropshire House. Establish the administrative and technical teams, and business cases (time scale early 2012).

3. **Education**

During 2011 we established a mentoring programme for non-clinical research fellows.

- Establishing a Mentoring Group for clinical researchers (senior and honorary Clinical Lecturers, time scale early 2012)

We now have an established Masters programme in cancer medicine (MSc Cancer).
Explore the opportunities for two potential new masters programmes (cancer nursing and cancer genomics) (time scale 2012/2013)

With Apollo Group’s Medvarsity platform we are planning to develop continuing professional development modules for health professionals in Southeast Asia (time scale early 2012)

- Establish international CPD online course/module series (time scale early 2012)
- During 2012/2013 we will also generate a ‘UCL Cancer’ weblink with the complete required undergraduate (MB BS) cancer curriculum.

4. Philanthropy

During 2012 we will instigate a number major fundraising initiatives with our CIRT. These will be in collaboration with the UCL Development Office, UCLH Charity and RFH Charity.

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, and new laboratory facilities.

5. 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 (time scale early 2012)
- Create a centralised system for selecting and updating UCL Cancer News and Newsletter items (time scale early 2012) http://www.ucl.ac.uk/cancer/about_us/news http://www.ucl.ac.uk/cancer/about_us/newsletter

6. 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 ~50 HEFCE-supported staff towards the research excellence framework (Unit of Assessment: Clinical Medicine).
Other initiatives during 2012

7. Cancer Clinical Research Facility (Cancer CRF, Dr Tim Meyer)

In 2011, nine early phase trials were open to which 50 patients were recruited. In 2012, the aim is to increase recruitment to 75 patients. Progressive increase in activity will be achieved by additional weekly clinics, increasing referrals, improving timelines to open trials and a move to 24 hour care. These will be pro-actively managed by the newly appointed portfolio manager working across the Cancer CRF and Sarah Cannon UK. There will be an increase in clinical fellows, with the development of an educational and research program linked to drug development. The GCLP laboratory will be extended to the new UCH Macmillan Cancer Centre (Prof John Hartley). With UCL-AD, we will initiate whole-exome sequencing for phase I trial patient’s tumours. In April 2012 the Cancer CRF will contribute to the UCL Cancer Research Public Open Day, allowing the local community to meet investigators and staff.

8. Finances

The current distribution of grant income is approximately 1/3 from Cancer Research UK; 1/3 from the MRC, Wellcome Trust and Leukaemia Lymphoma Research (LLR); and 1/3 from BBSRC, EPSRC, smaller charities, industry, CIRT and other philanthropy.

- Continue to diversify our grant income, by actively encouraging and facilitating applications to smaller charities, EU Framework, ERC and ‘non-traditional’ foundations, in addition to strengthening links with both small and large Pharma.

9. UCL Cancer Domain

- Establish a pan-UCL database of mouse models relevant to cancer
research. Explore opportunities for core resources for developing experimental models (lead, Prof Alison Lloyd)

- Initiate a pan-London tumour immunology Group, with a monthly seminar series (leads, Drs Clare Bennett & Sergio Quezada)

10. UCLP and Integrated Cancer System

We support the development of London Cancer, as the Integrated Cancer System for North and East London. We will work with Queen Mary College and with all of the NHS partner organisations to maximize the benefits to the population of North and East London arising out of scientific developments to improve cancer detection, screening, treatments and survival.

11. Initiatives supporting the Faculty of Medical Sciences

- Initiate with the Faculty a ‘mini-MD’, a 1-2 week course for non-clinical scientists in aspects of clinical research and medicine, including pathology, pharmacology, surgery and clinical trials

- Explore with the Faculty and Medical School opportunities for an MB MBA, with an affiliated School of Business. This would follow the successful introduction of MD MBA courses in North America and recently at the Karolinska Institute [http://www.hbs.edu/mba/academics/jointdegree/HBS-HMS/mdmba.html](http://www.hbs.edu/mba/academics/jointdegree/HBS-HMS/mdmba.html); [http://mdmbaprograms.com/resources/ACPE+PEJ+Jan+2011.pdf](http://mdmbaprograms.com/resources/ACPE+PEJ+Jan+2011.pdf)

12. Initiatives supporting the UCL Medical School

- Formulate with the School the strategy of UCL for the Crick Institute; recruit potential joint appointments with LRI

13. Delivering the cancer strategy for the UCLH/UCL BRC

- The Cancer Institute will play a key role in delivering the aims of the revised Cancer Programme within the UCLH/UCL BRC (2012-2016, Appendix 1)
Appendix 1

**UCLH/UCL BRC STRATEGY REFRESH**

**EXPERIMENTAL MEDICINE** We will focus on

1. New therapies, including novel devices and first-in-man studies
2. Improvements in diagnosis, treatment selection and evaluation of response
3. Repurposing of therapies

We will maximise the use of the NIHR Bioresource to evaluate predictors of disease and response, and invest in the infrastructure to fuel development of new interventions. Our extensive national and international collaborations across Themes are outlined within our original bid documents.

**Cancer Programme**

We will bring together the current cancer theme with the cancer-related activities within the following BRC themes: Cell and Gene Therapy, Respiratory, Anaesthetics and Critical Care (RACE), Oral Health, Imaging, Women’s Health, and Neurodiagnostics.

**Prediction and Stratification:** Genomic and epigenetic approaches will track tumour heterogeneity to assess their importance in: informing stratified care; determining mechanisms of resistance; and predicting outcome.

We will:

- Define the phenotype and genotype of 'relapse initiating cells' and the role of stem cells and genetic heterogeneity in the initiation of drug resistance for our key tumour types
- Develop whole ultra-deep cancer genome sequencing approaches to rapidly characterize tumour heterogeneity and cancer clonal evolution during therapy
- Implement at least three or more adaptive trials within five years that will stratify patients based on molecular knowledge

**Interventions:**

Drug Development and Optimisation of Targeted Therapy: An integrated programme will include comprehensive sequencing, proteomics analysis and RNAi screens undertaken on xenografted primary tumours, cell lines and circulating tumour cells to define putative drug targets and mechanisms of drug resistance for key tumour types (AML, glioblastoma, HNSCC, NHL, NSCLC, osteosarcoma, ovarian, renal cancer). We will accelerate development of in-house cancer therapies (immuno-, Ab-based and small
molecule). We will:

- Identify new putative drug targets for key tumour types
- Initiate at least three early phase clinical trials based on in-house conceptualised therapies

**Targeted Investigative Cancer Therapy:** We will use informatics approaches to correlate genetic heterogeneity with functional imaging. We will exploit novel functional imaging for targeted treatment (surgery, radiotherapy, laser and photodynamic). We will:

- Implement a clinical programme of image-guided treatment for prostate and brain cancer, exploiting the radiological phenotype to deliver new first-into-man treatments
- Delineate the role of MRI-PET and new molecular imaging technologies in targeted cancer therapy and personalised care

**Partnerships and Alignment:** We have a Cancer Research UK Centre, Experimental Cancer Medicine Centre (ECMC), CR-UK UCL Clinical Trials Centre (CTC), Leukaemia and Lymphoma Centre of Excellence, as well as a dedicated Cancer Clinical Research Facility (CRF). UCL’s imminent merger with the London School of Pharmacy will enhance existing programmes in cancer therapeutics and formulation. Early trials are supported by the Sarah Cannon Research Institute (USA). UCLP’s recently commissioned integrated cancer care leadership for North East and North Central London offers greater patient access and impact. During the past 5 years, UCLH and UCL have invested over £170 million in cancer-specific clinical care and research infrastructure, and the planned Proton Beam Treatment Centre will add further significant research capability.