

The First Annual meeting of the Cancer Genomics of the Kidney (CAGEKID) Consortium

In May 2011 the investigators who make up the Cancer Genomics of the Kidney (CAGEKID) Consortium (www.cng.fr/cagekid) met at Hinxton Hall near Cambridge to discuss the first year's progress and plan the next phases of this programme of work. They were joined for the second day of this meeting by experts from around the world who are conducting other major programmes of research into renal cancer.

Renal cancer, like all other cancers, develops when abnormalities accumulate in DNA and alter it so much that the cells grow in an uncontrolled way and may spread through the body. This produces the harmful effects which we recognise can occur from renal cancer. There have been significant strides in the treatment of renal cancer in the last few years. Notably these include targeted drug therapies such as sunitinib, derived from our knowledge of the way that renal cancers interact with their blood supply. If we are to make further progress in the treatment of renal cancer, it will be necessary to better understand the abnormalities within renal cancer cells and the consequences of those abnormalities. This should allow us to identify the appropriate markers which will indicate whether a particular tumour will be successfully treated by a particular treatment and also allow the identification of new treatments.

The CAGEKID Consortium are making use of state-of-the-art technologies to determine the complete DNA sequence of 100 renal cancers. Any genetic changes will then be confirmed in a further 2400 cases. In addition, they will determine the consequences of these DNA abnormalities. The genetic code is set out in DNA but to influence the behaviour of cells and people, its code has to be read and transcribed in a process called "gene expression", via RNA (ribonucleic acid) which is an intermediate in conveying the genetic code, to make proteins which are the building blocks of the body and determine its functions. The CAGEKID investigators are also investigating how this process is changed in cancer. DNA sequencing technologies have moved forward dramatically in recent years and the CAGEKID Consortium includes members which are at the forefront of this technology. In addition to sequencing technologies, state-of-the-art approaches are being used to measure the process of gene expression and its consequences.

The Consortium contains members from Paris, Toulouse and Lyon (France and the International Agency for Research on Cancer), Prague (Czech Republic), Moscow (Russia), Stockholm and Uppsala (Sweden), Leeds and Hinxton (UK) and a network of contributing centres across Europe. It has received a grant from the European Union as part of the Framework 7 Research Programme for Health.

In the first year the methods for completing this important work have been developed and progressed steadily. It is critically important to identify renal cancer tissue samples that are studied in the laboratory carefully to decide what type of cancer they are – and the number of cancer cells present.

Work on the methods for doing this is now complete and dozens of tumours have been collected. Sequencing work of complete genomes has already been completed in almost 50 tumours and will ultimately be carried out to some degree in over 2000 more tumours. Recently developed computer-based information analysis of these sequences is ongoing and first results are anticipated in the summer of 2011. In parallel work on the expression of genes within the tumours and the identification of proteins derived from those genes is advancing steadily.

Around the world there are other major programmes of research into renal cancer which are also progressing steadily. Presentations were given from Scotland (the SCOTRCC programme) and from representatives of two large consortia (PREDICT and EuroTARGET programmes) also funded by the European Union to find markers of response to treatment. Work funded by the Wellcome Trust and Cancer Research UK at the Sanger Institute on the Hinxton Hall site was summarised. The work being carried out in the United States from the Cancer Genome Atlas Study was also discussed. From Italy, Germany, Singapore and France presenters summarised important research programmes that will provide further tissues and further understanding of the molecular biology and behaviour of renal cancers.

Why does this matter to renal cancer patients? Identifying every single gene that is altered in renal cancer will provide information about biological changes involved in this disease. They may also highlight biomarkers that will indicate to scientists whether the existing treatments for renal cancer are likely to work for an individual patient. Such biomarkers will be central to the development of effective programmes of treatment for renal cancer in the next 10 years. Our further understanding of the molecular genetics, molecular biology and the overall behaviour of renal cancers will clarify new targets against which drugs and vaccines may be developed. The CAGEKID Consortium carries promise that scientific advances will underpin benefits for renal cancer patients in the future. No one described the work of CAGEKID as "a breakthrough". It represents the application of the best of modern science and technology to the challenge which is presented by renal cancer. This work will take many more years to come to fruition. However, the commitment and excitement of the scientists and their clear and firm intention to ensure that their science is translated into benefits for patients, offers hope for the future.

Patients are contributing to the work of the consortium by giving permission, prior to nephrectomy, for a tumour sample to be taken and used to further this work and by providing detailed background information about their clinical cases and lifestyle.

The CAGEKID investigators welcomed the advice of patients in the meeting about the best approaches to communicating their work – and an initial result of those discussions is this summary and more information can be found at the CAGEKID website (www.cng.fr/cagekid).