

Bristol rises to the cancer challenge

“Cancer remains a major challenge to human health in the 21st century, so we need to make sure that what we learn in the laboratory is appropriately applied in the clinic.”

Bass Hassan, Professor of Adult Oncology, Department of Pathology and Microbiology



Cancer is essentially an age-related phenomenon. A marked increase in incidence occurs after 70, although it does afflict younger adults and, more tragically, children. Projected epidemiological calculations suggest that by the year 2050 we will double our cancer incidence. So how are we going to rise to this challenge, and what can the research teams in the University of Bristol do about it? Cancers arise from mistakes that develop in normal cells in our body.

We are made up of billions of these cells and mistakes gradually accumulate within them as we grow older. Eventually these mistakes can make the cells divide faster than they should, until the small clump of cells forms a tumour. If the tumour progresses, it either invades the surrounding tissue, or cells break off and spread to other sites in the body – a process called metastases. When

either process occurs, the tumour is malignant and more difficult to treat.

Impacting on cancer that may be at the early stages has largely been reliant on physically detecting the tumour and removing it by surgery and, when it is possible to perform

Our ability to detect the spread of disease has been much improved by scanners that give detailed images from inside the body, and the University is now planning to develop a centre dedicated to these new ways of imaging that will offer patients world-class facilities. In addition,

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such an operation, this cures the vast majority of patients – the removal of a breast or colon tumour, for example. But deciding whether an operation is worthwhile is often a difficult decision and Ms **Jane Blazeby**, a specialist surgeon based at the Bristol Royal Infirmary, and her team are examining the short- and long-term consequences of some of the more serious types of cancer operations.

by providing more sensitive scanners, such as positron emission tomography (PET), information about the activity of the cancer-causing cells will allow researchers to understand the disease better.

In the past few years a number of drugs have appeared that offer new treatments, often without any of the side effects of conventional →

→ remedies such as chemotherapy. Some of these treatments, such as using antibodies to treat breast and colon cancer, and new tablet-based treatments for rarer leukemias and abdominal tumours, are now in routine use by the teams of doctors and nurses in the Bristol Haematology and Oncology centre. Another group, led by Dr **Keith Brown**, is based in both the research laboratories and in the Bristol Children's Hospital. This team has developed an understanding of how genes control the growth of some

Chris Paraskeva and his team are studying one such class of drugs based on the type of anti-inflammatory drugs that can be obtained in your local chemist. The team is involved in a big UK trial of this approach in colorectal cancer and in a few years these drugs may be prescribed by GPs in order to prevent future cancers. Other forms of cancer ‘prevention’ are screening studies, such as mammography in breast cancer. These screening studies detect blood in our stools for colorectal cancer, or cancer

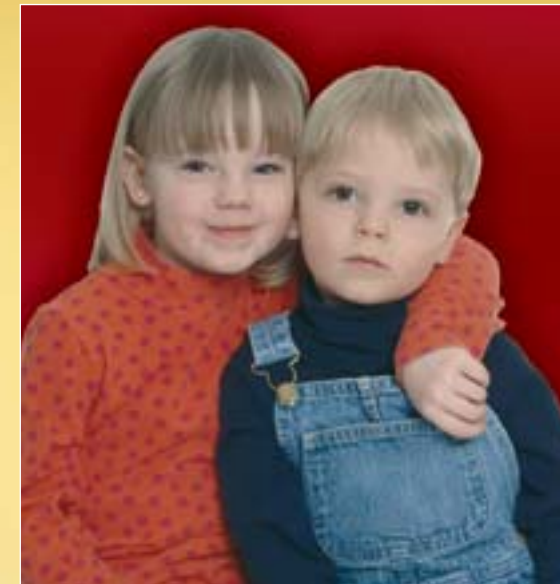
We may not be able to cure cancer, but we may be able to control it

common childhood cancers, and is now trying to progress ideas for new treatments that might exploit this knowledge.

So there is now real hope that while we may not be able to cure cancer, we may be able to control it with regular medication over many years. Some of these new developments are reaching the stage where people who have reason to believe that they may be prone to cancer are offered treatments that could prevent the cancer forming in the first place. The most famous of these drugs is Tamoxifen, used to prevent breast cancer, but many others are being developed. Professor

‘markers’ in the blood, such as those found in prostate cancer. Professor **Jenny Donovan** and her team are running national research studies into this common form of male cancer.

What we lack are new treatments that specifically target tumours, but a new group has recently arrived in Bristol, led by Professor **Bass Hassan** and Dr **Robert Jones**. They are interested in the intimate balance between the proteins produced by our bodies that promote cancer growth, with other proteins that act to prevent and limit the action of the growth promoter. This balance is very finely controlled during our development and is kept in check throughout our adult life. However, as a result of subtle changes in the expression of the genes within tumour cells, this intricate balance can be disrupted during early tumour progression, and even a slight increase in the proteins that promote growth can result in a rapid progression of the tumour. Some of the growth-inhibiting proteins are amenable to being produced in the laboratory and can be added back into patients with tumours in order to redress the balance, whereas others require a drug to be used specifically to stop the growth-



promoting protein from working properly. The ability to alter the balance of ‘good’ and ‘bad’ proteins in cancer means these approaches are generic – they might work for all cancers. While the immediate consequence of this may be a series of laboratory experiments, the real aim of this group is to transfer information gained in the lab directly into clinical trials to be performed here in Bristol.

With the expansion in understanding how genes predispose us to cancer, there is a fantastic opportunity here in Bristol to put together dynamic teams that can address many of the challenges we face over the coming years. But although all the tools are in place – early diagnosis, targeted treatments and, ultimately, complete prevention – these approaches must be carefully judged, tried and tested. Some may take some years to develop fully. ■

www.bristol.ac.uk/Depts/PathAndMicro

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The new cancer laboratory

Bass Hassan