PERSONALISED TREATMENTS

CANCER RESEARCH UK

WORKING TOWARDS CURES

Personalising cancer treatments, by matching patients with the treatment that will work best for them, could transform the lives of people with the disease. Last year we spent over £40 million on research and infrastructure that will help deliver personalised medicine for cancer.

We're leading the way towards personalised medicine

HOW DO PERSONALISED TREATMENTS WORK?

No two cancers are the same, so even patients with tumours in the same part of the body may respond differently to treatment. Personalised treatments tackle each patient's unique cancer. This doesn't just include medicines, but radiotherapy and surgery too, as they are planned for the size, shape and position of each tumour.

HOW DO PERSONALISED MEDICINES WORK?

Personalised, or precision, medicines work by specifically targeting the faulty genes and molecules in an individual's cancer. To work out which treatment is needed, doctors look at the faults underpinning a patient's cancer and match them to the right medicine. Patients with the same fault can be given the same medicine.

WHAT NEXT?

By focusing on the faulty genes in a patient's cancer, rather than where it started, drugs designed for one type of cancer may prove useful in other types that share those faults too. We're running clinical trials to test these ideas and figure out which treatments work best for which patients. This should speed up the development of new cancer therapies.

DID YOU KNOW?

- Tumours are extremely variable, so we need a variety of treatments to deal with them.
- Modern technology means we can examine a cancer's faulty genes quicker than ever before.
- Personalised cancer drugs include trastuzumab (Herceptin), imatinib (Glivec) and erlotinib (Tarceva).
- Some radiotherapies direct the radiation precisely at the tumour, even if the patient moves during treatment.

Have you got questions about cancer?
Visit **cruk.org/cancer-help** or call our specialist cancer nurses on **0808 800 4040**

OUR SCIENCE CHANGES LIVES

Our research underpinned the development of Herceptin. This drug works by blocking the activity of a molecule called HER2, which makes cells grow out of control. It's found in abundance in some cancers, which are called HER2 positive. Herceptin has made a real difference for people with the type of stomach or breast cancer that responds to this drug.

DEBORAH FROM LONDON KNOWS THE IMPORTANCE OF RESEARCH

"I was diagnosed with breast cancer in 2004 after I found a lump in my breast while I was on a business trip. Doctors identified my cancer as HER2 positive, which meant I could be given the drug Herceptin. I responded really well to the drug and, thankfully, after a long battle, I'm now in good health again."

Cancer Research UK t: +44 (0)20 7242 0200

For information on personalised treatments, go to **cruk.org**

PROFESSOR PETER JOHNSON, OUR CHIEF CLINICIAN

"The exciting progress we've made in understanding how cancers develop gives us hope that treatments targeted at the faulty genes that cause cancer can revolutionise medicine in the next decade. Our Stratified Medicine Programme is one of the largest in the world, working to improve treatments for as many patients as possible."

We receive no government funding for our research

MAKING A DIFFERENCE

Personalised medicine isn't just about matching the right drug to the right patient – it's also about having more targeted treatments to choose from, and delivering this new type of care within the NHS.

HITTING BRAF

Our scientists found that faults in a gene called BRAF contribute to most cases of malignant melanoma, the most dangerous type of skin cancer. Building on our fundamental research, the drug vemurafenib was developed to treat melanoma patients with faults in BRAF.

PRECISION RADIOTHERAPY

We had a crucial early role in the development of precisely targeted radiotherapy known as intensity modulated radiotherapy (IMRT). Using this approach, doctors can maximise the dose of radiation to a cancer while reducing damage to surrounding healthy tissues.

WORKING WITH THE NHS

Our Stratified Medicine Programme has already shown that rapid genetic testing of cancer samples can be done within the NHS. The programme is now working out how molecular testing could be used to determine the best treatments for patients.

TARGETING EGFR

Our early lab work on a molecule called EGFR was the springboard for the development of the lung cancer drug erlotinib. Around a quarter of lung cancer patients have excessive levels of EGFR in their tumours and could benefit from this drug.

OUR PROGRESS IS YOUR PROGRESS

We are leading the way towards an era of personalised cancer treatment - from hunting for faulty genes and molecules to guide treatment decisions, through to developing new targeted therapies.

Cambridge: Dr James Brenton is developing a test to help doctors predict who will respond to chemotherapy for ovarian cancer, to make sure women are getting the most suitable treatment.

Birmingham: Professor Gary Middleton is running the National Lung Matrix Trial which aims to match groups of lung cancer patients to the best possible new treatments for them.

Manchester: Professor Caroline Dive is analysing stray tumour cells found in a patient's blood to see how their cancer responds to treatment, so that therapy can be more accurately tailored.

Oxford: Professor Tim Maughan is using the latest genome-based technology to predict the most effective treatments for different bowel cancer patients.

Dundee: Professor Roland Wolf is studying how differences in patients' DNA alter the way they process drugs, to help predict response to treatment and improve future drug development.

Newcastle: Professor Ruth Plummer is running a clinical trial for a new type of drug called a PARP inhibitor, designed to treat patients who have inherited a faulty BRCA gene.

Find out more: download other research leaflets in this series at **cruk.org/researchleaflets**

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