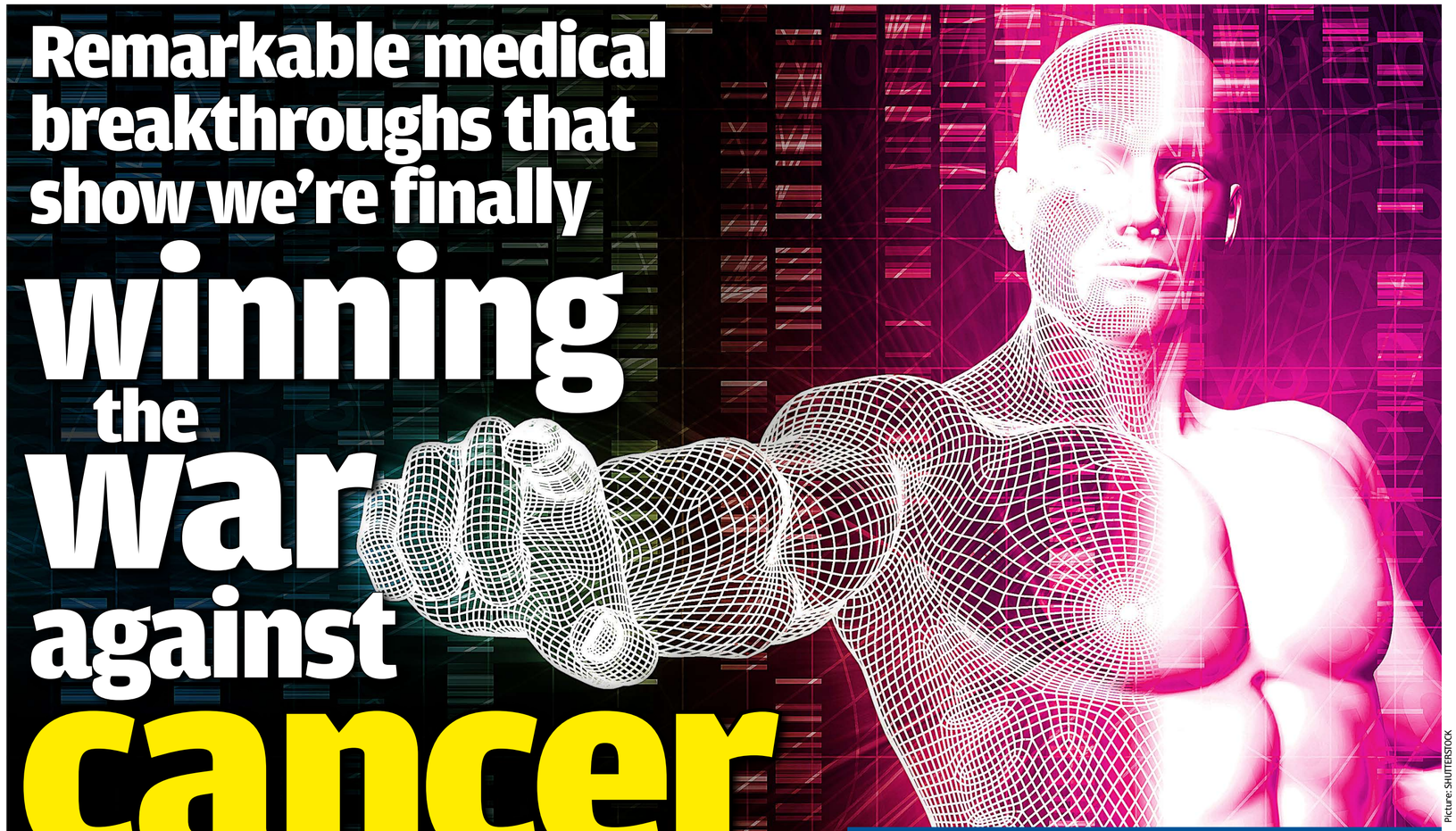
Remarkable medical breakthroughs that show we're finally winning the war against cancer



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It's the holy grail of medicine: A cure for the most feared disease of all. As this special report reveals, we're closer than ever . . .

By RACHEL ELLIS

FINDING a cure for cancer is one of the Holy Grails of medicine. However a series of recent breakthroughs raise the prospect that we're finally getting to grips with the disease that half of us will develop.

Cancer survival rates in the UK have doubled over the past 40 years and already half of cancer patients live for more than ten years.

But according to Professor Karol Sikora, one of the country's leading specialists and dean of the University of Buckingham Medical School, in ten years time that figure will be closer to 70 per cent, meaning that, for many, cancer will become a disease you live with rather than die from.

'Over the last decade, there has been a huge increase in our understanding of the molecular changes that occur in the body's cells that lead to cancer,' he says. 'And in another ten years we will understand a lot more. We are making very good progress.'

Here is a round-up of some of the latest and most promising developments.

BLOOD TEST SPOTS CANCER BEFORE IT DEVELOPS

IN ONE of the more exciting breakthroughs announced just this week, scientists are developing a blood test that can diagnose any type of cancer a decade before symptoms appear.

Taking a sample of a patient's blood and running it through a machine in the laboratory, they can check for any DNA shed by tumours — this starts circulating in the bloodstream long before patients feel symptoms, giving doctors an early warning that the patient will develop cancer.

This DNA can tell scientists where tumours are growing and how far the cancer has spread. U.S. researchers believe the test, known as liquid biopsy could halve cancer death rates and would be particularly beneficial for the deadliest forms of the disease such as lung, pancreatic and ovarian, which are often diagnosed late.

Trials into the test, carried out on 161 patients already diagnosed with breast, lung or prostate cancer and presented at the American Society for Clinical Oncology (ASCO) conference in Chicago this week, found it could correctly identify the tumour in 90 per cent of cases.

The test, which has received funding from Microsoft founder Bill Gates, could be available within two years. The eventual goal is to offer it to patients alongside routine checks on their blood pressure and cholesterol at their GP surgery.

It currently costs £1,500 a time but costs should come down. Dr Nick Turner, from the Institute of Cancer Research and the Royal Marsden Hospital in London, said: 'The potential is very exciting.'

3P STATIN BOOSTS SURVIVAL

STATINS — drugs widely taken to lower cholesterol — also reduce the risk of dying from breast, bowel, prostate, ovarian and bone cancer. A major new study involving almost 200,000 women with breast cancer has found the 3p-a-day pills boosts survival rates by 40 per cent by halting the growth of tumours.

This could lead to the drug being routinely used to treat the disease alongside surgery and conventional drugs such as chemotherapy. The study, by scientists from the National Cancer Centre in Beijing, found that on average, women who had taken any kind of statin were 27 per cent less likely to die from cancer within four years than those who'd never take the drug.

And patients taking the most commonly prescribed statins in the UK — such as simvastatin and atorvastatin — were 43 per cent less likely to die from the disease.

Scientists believe these types of statins stop cancer cells growing and dividing, and may also boost the immune system, enabling it to fight the disease better.

Baroness Delyth Morgan, of the charity Breast Cancer Now, said: 'This study adds to the emerging picture that some statins could be useful for treating breast cancer, but we'd need to see clinical trials.'

A separate U.S. study on 22,110 men with prostate cancer, in 2015 found that those who happened to be taking statins were 42 per cent less likely to die from the illness.

GAME-CHANGER FOR NECK TUMOURS

AN IMMUNOTHERAPY drug has been hailed as a potential 'game changer' after being found to greatly improve survival for patients with relapsed head and neck cancer — a disease notoriously difficult to treat.

Nivolumab is the first treatment to extend survival in a phase III clinical trial (where it was compared with standard treatment) for patients with head and neck cancer in whom chemotherapy had failed — and it did so with fewer side-effects than existing options.

After a year, 36 per cent of patients treated with nivolumab were still alive compared with 17 per cent of those treated with chemotherapy, according to the study of 361 patients published in the New England Journal of Medicine last year. These patients are currently expected to live less than six months. The drug works by stimulating the immune system to fight cancer cells.

Kevin Harrington, a professor of Biological Cancer Therapies at the Institute of Cancer Research and Consultant at The Royal Marsden NHS Foundation Trust who led the trial, said: 'Nivolumab could be a real game-changer for patients with advanced head and neck cancer. These results indicate we now have a new treatment that can significantly extend life, and I'm keen to see it enter the clinic as soon as possible.'

SUPER-PRECISE RADIOTHERAPY

A PIONEERING new type of radiotherapy machine could transform the care of cancer patients. MR Linac machines are the first to be able to generate both MRI images and deliver X-rays as well as radiotherapy at the same time, allowing radiotherapy to be adjusted in real time and delivered more accurately and effectively.

It means patients can receive radiotherapy to tumours that move during treatment, when they breathe or if their bladder fills, for instance. This will make the machines particularly useful for treating lung, cervical, prostate, bowel and bladder cancer.

Delivering radiotherapy more precisely will also make the treatment more effective and reduce side-effects to surrounding healthy tissue. The Institute of Cancer research and The Royal Marsden Hospital NHS Foundation Trust, both in London, are the first places in the UK to install the machines.

The first patients are due to be treated later this year, initially through clinical trials.

MAJOR PROSTATE BREAKTHROUGH

A NEW way of treating prostate cancer could boost survival rates by almost 40 per cent, according to new research. Adding the hormone therapy abiraterone at the start of treatment means patients whose disease has spread to their pelvic area or other organs are 37 per cent more likely to be alive after three years.

Researchers from Birmingham University who carried out the study say this new approach will 'transform' prostate cancer treatment. Currently, patients whose cancer that has spread to surrounding tissue are given only one type of hormone therapy. This blocks the action of male sex hormone testosterone, which fuels tumour growth.

But, research involving 1,900 men presented at the ASCO conference last week, found that abiraterone actually shuts down the production of this hormone.

Professor Nicholas James, who led the Cancer Research UK-funded trial known as STAMPEDE, says: 'These are the most powerful results I've seen from a prostate cancer trial — it's a once in a career feeling. This is one of the biggest reductions in death I've seen in any clinical trial for adult cancers.

ADVANCE FOR ANGELINA CANCER

WOMEN with the same genetic form of breast cancer as Angelina Jolie could benefit from a drug which prevents tumours spreading by over 40 per cent.

Olaparib — a drug that works by preventing cancer cells from fixing fatal faults in their DNA — is used to treat women with the advanced hereditary form of the disease caused by the faulty BRCA gene. Results of a new study show that after 14 months, those women taking the drug twice daily, had a 42 per cent lower chance of the cancer spreading compared with standard chemotherapy , scientists at the Memorial Sloan Kettering Cancer Center in New York told the ASCO conference.

Kefah Mokbel, professor of breast cancer surgery at The London Breast Institute, says that Olaparib is one of a number of targeted biological therapies which one day could be used instead of chemotherapy to treat breast cancer.

'These drugs are not as toxic and target tumours more precisely. The hope is to treat breast cancer in the same way as chronic conditions such as diabetes. We can't cure them but we can keep them under control. These are exciting times.'

Drug to shrink ovarian cancer

THOUSANDS of women with ovarian cancer could be helped by a promising new drug, say British scientists.

Early results show the treatment called ONX-0801 dramatically shrinks tumours in patients in the advanced stages of the disease, which is difficult to treat. Tumours shrank in seven of the 15 women who took part in a small trial.

ONX-0801 is the first in a new class of drugs which latch on to cancer cells, while leaving healthy tissue alone, thus reducing the side-effects often seen with traditional chemotherapy. Once locked on to a cancer cell, the drug blocks the action of a key molecule, causing cell death.

Researchers from the Institute of Cancer Research and the Royal Marsden NHS Foundation Trust in London had only been testing the drug to see if it was safe for humans to take, but found it brought an almost instant improvement in the condition of patients.

Rich cancer patients can save us – by paying to save themselves

By ALEXANDER MASTERS

VINCE HAMILTON and Dido Davies were as different as you could imagine. One was an international businessman and multi-millionaire oil-baron from Arizona; the other was a brilliant biographer, editor and expert on the lost bones of St Thomas More.

She was my best friend and occasional co-author: a woman I looked up to and loved.

Vince and Dido never met, but they have two things in common. They both died of the same rare disease, and they may — just may — have changed the world of medical research for the better.

In 2007, Dido developed neuro-endocrine cancer of the pancreas, the same type that killed Steve Jobs, co-founder of Apple Computers. It's a rare, comparatively slow-growing disease. Two years later it spread to her liver.

Surgery, chemotherapy and radioactive proteins pumped into her blood all failed. Meanwhile, I hunted the internet in an attempt to find something that might prolong her life.

I'm not a research scientist; I don't know a thing about cancer. I write biographies. But by astonishing luck I stumbled across a YouTube lecture about Canadian pigs.

Veterinary scientists had discovered that these porkers were naturally infected by a previously unknown virus. It did nothing to the pigs, but what it did in the lab was barely believable: it eliminated neuroendocrine cancer.

Yet the lecturer forgot to mention who was developing the new treatment, so I freeze-framed the video and took a screenshot of a poster behind the lectern. That led me to a company called Neotropix, which had gone bust.

Its defunct website linked, via a company in San Francisco, to a PhD thesis by a Polish immunologist living in Sweden, whose footnotes gave a Skype address, which I rang.

The man who answered was Professor Magnus Essand at Uppsala University, one of the world's experts on using viruses to treat cancer.

He had no involvement with the Canadian pigs, but he had a different drug, half forgotten, in his freezer. It also eliminated neuroendocrine cancer with remarkable success — at least in the lab.

Yet this admirable microbe was not being tested on humans because he couldn't raise the £2million needed to begin the experiments.

'If I get you the money, would you promise to put Dido on the trial?' I asked. I thought the suggestion was probably illegal. It definitely sounded unethical. To my amazement, Professor Essand said yes.

I did get the money — with the help of 3,846 other people around the world. With Dominic Nutt, a publicist who'd worked for refugee charities, we started a campaign group called iCancer (*icancer.org.uk*).

Dom's been kidnapped, shot at and bombed in Afghanistan and Sri Lanka, but knows no more about medicine than I do, so he brought in Liz Scarff, who runs a social media company. Liz broke internet records for the amount she raised through crowdfunding — around £700,000.

Picture: SARAH BURRIDGE

Inspiration: Dido Davies

MEANWHILE Dom and I concentrated on tracking down somebody very rich with the same disease as Dido, to persuade that person to pay the remaining £1.3 million.

We found our candidate quickly: Vince, the oil baron. He read about our campaign and rang Uppsala looking for another Dido-style deal.

He and Dido both died in 2013, before Professor Essand's lab even had time to complete the paperwork for the trial.

But I couldn't get rid of a niggling idea that Dido and Vince had inspired. If it wasn't unethical or illegal to offer a trial place to the person who'd funded it (assuming they were a suitable trial candidate), then why couldn't this tactic be used to raise money for other promising yet neglected medical research?

The process would have to be carefully policed to ensure fair play and good quality science, but otherwise it was a beautifully simple idea which might bring in tens of millions of pounds of new money for underfunded research, and which had, astoundingly, never been tried

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