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Cancer Services Bulletin: July 2014

Lung

'Liquid' lung cancer biopsies will speed up drug resistance research

Analysing cancer cells from a lung cancer patient's blood sample could help monitor and predict their response to treatment, according to a new study from scientists in Manchester.

The finding will speed up research into new therapies, and improve the understanding of how tumours become resistant to drugs, experts said.

The new research looked at blood samples from six patients with a form of the disease called small-cell lung cancer (SCLC), "a devastating disease, where treatments often work initially, but then the tumour develops resistance and carries on growing," said Cancer Research UK's Professor Charlie Swanton, who was not involved with the research, but who works on a large UK lung cancer study, called TRACERx that is looking at how lung cancers evolve over time.

In their new study, published in the journal Nature Medicine, Professor Dive's team, working with lung specialists at The Christie NHS Foundation Trust, found that blood samples from patients with SCLC had many more circulating tumour cells in them than did samples from patients with other types of cancer.

They discovered that the number of CTCs in each SCLC patient's sample was related to their survival – patients with fewer tumour cells in their blood lived longer.

In addition, the team were able to use cells extracted from a patient's blood to study their disease in mice. When they treated these mice with the same chemotherapy drugs as the patients, the mice responded in the same way as each donor patient.

Cancer Research UK launches visionary new lung cancer centre of excellence

Cancer Research UK is bringing together leading researchers from London and Manchester in the groundbreaking new Lung Cancer Centre of Excellence at Manchester and UCL.

The new Centre is a key component of Cancer Research UK's renewed focus to beat lung cancer. The disease is the second most common cancer in the UK and the biggest cancer killer.

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Lung

Developing better treatments for patients with lung cancer has lagged behind other cancers, with little improvement seen over time due to its complex biology, resulting in poor survival rates.

The Centre of Excellence will unite the strengths of the individual research hubs into one new research entity with a single strategy for advancing progress in lung cancer. The Centre will build on existing strengths and seek to recruit a cadre of international scientists, making the UK a true global research leader in this very important disease.

Several areas of research strength are unique to each site but complement each other.

Scientists in London are leading research into harnessing the immune system to fight the disease. They also perform world class research investigating the complex genetics of lung cancers - understanding how they can be genetically different within the same tumour and between different people, and change during the course of the disease.

This will combine with expertise in Manchester, including researchers at the University of Manchester, The Christie and University Hospital of South Manchester NHS Foundation Trust, in radiotherapy, discovering new cancer drugs and uncovering biomarkers, which circulate in the blood stream and can be used to monitor a patient's disease. Both sites have strong reputations for lung cancer clinical trials and the new Centre will also build critical mass in the early detection of lung cancer.

Breast

Leukaemia gene provides clue to treating triple negative breast cancer

Cancer Research UK scientists have discovered that a gene previously linked to leukaemia could provide an urgently needed target for the development of drugs to treat patients with 'triple negative' breast cancer, according to a study published in PLOS ONE.

The team of researchers at the Cancer Research UK Beatson Institute and University of Glasgow, measured levels of a protein produced by the RUNX1 gene in tumour samples from 483 patients with a range of breast cancer types.

They found that patients with triple negative breast cancer who had the RUNX1 protein in their cells had poorer survival compared to those without the RUNX1 protein.

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Breast

Of the 118 patients with triple-negative breast cancer, those who tested positive for the RUNX1 protein were around four times more likely to die from their cancer in the follow-up period – around 14 years on average – than those without it.

And the faulty gene could provide a target for the development of new drugs to treat the disease as well.

Immune cells found near tumours boost breast cancer survival

Women with breast cancer are 10 per cent more likely to survive for five years or more if they have certain immune cells near their tumour, according to research published in Annals of Oncology.

The researchers looked for an immune cell called a killer T cell which specialises in destroying rogue cells in the body, such as cancer cells.

The Cancer Research UK study found that when these immune cells were present, survival improved for women with ER-negative and ER-positive HER2-postive breast cancer. However, survival didn't change for women with ER-positive HER2-negative breast cancer.

Study author, Dr Raza Ali, National Institute for Health Research clinical lecturer at the Cancer Research UK Cambridge Institute, University of Cambridge, said: "Cancer often finds ways to escape the immune system, but helping immune cells to recognise cancer as a threat - and attack it - provides a promising and powerful avenue for new treatments. We've shown that women who have killer T cells present at the site of their tumour are likely to live longer.

"This important insight could help doctors personalise a woman's treatment based on her immunological profile and also suggests that new treatments should harness the immune system to fight cancer."

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Pancreatic

Scientists discover new route to boost pancreatic cancer treatment

Cancer Research UK scientists have uncovered new insights into how a key pancreatic cancer drug – gemcitabine – is broken down in tumour cells, according to research published in the British Journal of Cancer .

The scientists, based at the Cancer Research UK Cambridge Institute, have discovered that gemcitabine interacts with an important pathway in cells – called the Kennedy Pathway – which cells use to make special fats.

This research has identified that the drug is broken down in tumour cells by enzymes in the Kennedy Pathway, which might be an alternative way in which it works.

The findings also suggest that using linoleic acid in combination with gemcitabine increases the amount of gemcitabine in tumour cells, possibly making it more effective.

Four in 10 pancreatic cancers could be prevented by lifestyle changes

Almost 40 per cent of pancreatic cancers – one of the deadliest forms of cancer – could be avoided in the UK through maintaining a healthy weight and not smoking according to Cancer Research UK, in a call to arms against the disease.

Every year 8,800 people are diagnosed with the disease in the UK but survival rates remain very low, with only three per cent of people diagnosed with pancreatic cancer surviving their disease for five years or more after their diagnosis.

Cancer Research UK has made pancreatic cancer research a priority, and has the bold ambition to more than double its annual spend of £6million on research into the disease over the next five years. The charity is investing in fundamental biology investigating how the cancer spreads as well as trials looking at boosting the effectiveness of the standard chemotherapy treatments in pancreatic cancer patients.

While more research is needed to find better ways of diagnosing and treating the disease, there is evidence to suggest that some pancreatic cancers are linked to being overweight and to smoking– and almost four in 10 could be prevented by lifestyle changes to address this.

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Skin

Eczema may offer clues to skin cancer prevention

The way the immune system reacts to eczema could offer protection against skin cancer, new research suggests.

Scientists at King's College London found the immune response triggered by the skin condition reduced the number of tumours in mice by causing cancerous cells to be shed from the skin, rather than developing into tumours.

Dr Emma Smith, senior science communications officer at Cancer Research UK – which part-funded the study – cautioned that the research was still in its early stages, and more work will be needed to see whether eczema also has the same protective effect in people.

To mimic the condition in the lab, researchers specially bred mice to lack three particular molecules that help make up the skin's natural barrier - similar to the defects found in people with eczema.

Researchers then compared the effects of two chemicals that encourage tumour formation in these mice.

They found that the number of benign tumours each mouse developed was six times lower in those lacking the skin barrier molecules, compared to mice with normal skin.

Both groups of mice were equally susceptible to genetic faults caused by the chemicals, but exaggerated inflammation processes in the specially bred mice led to them shedding potentially cancerous cells from their skin.

MPs call for further restrictions on sunbeds

A group of MPs has called for more restrictions on sunbeds, including a ban on unmanned tanning salons.

The report, from the All Party Parliamentary Group on Skin, said that tanning facilities where people can use sunbeds without supervision should be prohibited.

MPs said they were "concerned" that, while bans on unmanned tanning salons are in place in Wales and Scotland, there is not one in place in England.

"We recommend that the Department of Health urgently looks into introducing similar measures in England," they said.

The group's report into the use of sunbeds also recommended that these facilities should also provide "balanced" health information and safety goggles for users.

Ministers should also consider enabling local councils to licence facilities offering sunbeds, the report states.

The MPs also recommended that salon staff are trained to spot different skin types and their associated risk levels when exposed to UV light. This could mean that they are able to "screen" users who are at increased risk.

And there should be compliance testing to ensure that facilities are complying with restrictions on UV emission, their report said.

Sara Osborne, Cancer Research UK's head of policy, said the recommendations were "so important", since the evidence that sunbeds increase the risk of skin cancer is clear.

"Research has shown that using sunbeds for the first time before the age of 35 increases the risk of developing malignant melanoma by nearly 60 per cent. Melanoma is the most dangerous form of skin cancer and the second most common cancer in people aged 15 to 34."

Scientists find new way to combat drug resistance in skin cancer

Rapid resistance to vemurafenib – a treatment for a type of advanced melanoma, the deadliest form of skin cancer – could be prevented by blocking a druggable family of proteins, according to research* published in Nature Communications.

Scientists at the Cancer Research UK Manchester Institute, based at the University of Manchester, have revealed the MLK family of four enzymes 'undoes' the tumour-shrinking effects of vemurafenib.

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Around half of metastatic melanomas – aggressive skin cancer that has spread to other parts of the body – are caused by a fault in the cell-growth gene BRAF, causing the signal telling cells to multiply to be permanently switched on.

Vemurafenib blocks BRAF and stops the cancerous cells from growing. But cancer cells usually find a different way to turn the pathway back on – cancelling out the drug's effects. Most metastatic melanoma patients stop responding to the drug within about six months, leading to a relapse of the disease.

This new research has found MLK enzymes can be responsible for reactivating the BRAF pathway, even in the presence of vemurafenib. By blocking these enzymes, which previous studies have shown is already possible, the researchers hope they can stop resistance to vemurafenib so the cancer cells are still vulnerable to the drug.

The findings also show that some melanoma patients have additional gene mutations that switch MLK genes on, causing patients to develop resistance to vemurafenib more quickly.

Researchers discover how 'wriggling' skin cancer cells go on the move

Cancer Research UK scientists at King's College London have discovered a new way that melanoma skin cancer cells can invade healthy tissue and spread round the body, according to research published in Nature Communications. "Developing drugs that block MMPs could be an exciting new avenue for treating malignant melanomas in the future." - Dr Victoria Sanz-Moreno, study author

The work, funded by Cancer Research UK, the Royal Society and the Dunhill Medical Trust, reveals a potential new target for drugs to treat malignant melanoma – the deadliest form of skin cancer that kills around 2,200 people every year in the UK.

Melanoma cells can adopt different shapes to squeeze their way out of a tumour and spread through the body. The cells become rounded to travel through the bloodstream or invade soft tissues such as the brain.

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Skin

The scientists discovered that when melanoma cells adopt a rounded amoeba-like shape to 'wriggle' through the body and invade new areas, they produce molecules called matrix metalloproteinases (MMPs). These help break down surrounding tissue and keep them on the move.

While it was known that elongated skin cancer cells produce MMPs to break down surrounding tissue, this is the first time that the rounded amoeba-like cells have also been found to produce these molecules.

Bowel

70 per cent take part in bowel screening but not enough do it regularly

New research shows that 70 per cent of people send back at least one bowel screening test kit, according to a study published in the journal *Gut*.

But only around 40 per cent return kits consistently, which is needed to maximise the chances of detecting bowel cancer.

The study also highlights that that those from more deprived backgrounds were less likely to take part in bowel cancer screening than those from affluent backgrounds.

Scientists from the Cancer Research UK Health Behaviour Research Centre at University College London (UCL) looked at data from over 60,000 people in Southern England aged between 60-64.

People were sent bowel cancer screening kits every two years as part of the National Bowel Cancer Screening Programme and the researchers tracked their responses to three successive screening invitations.

Worryingly, they found that while a large majority of people completed and returned at least one test kit, only around four in 10 (44 per cent) sent back all three tests.

Crucially, these tests need to be done every two years to maximise the chance of detecting cancer – which may be missed if only one test is completed. The study also found that repeat invitations did not reduce differences in participation rates between people from affluent and deprived backgrounds.

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Queen's University Belfast researchers' breakthrough leads to new clinical trial in bowel cancer

Cancer Research UK scientists have discovered how two genes – called MEK and MET – cause bowel cancer cells to become resistant to treatments used against the disease, according to research in the journal *Cell Reports*.

The team at Queen's University Belfast, are now testing a new approach to targeting MEK and MET in a clinical trial.
The two proteins were uncovered when the researchers looked at all the different pathways and interactions taking place in bowel cancers that have faults in the KRAS gene. Around 45 per cent of bowel cancers have this fault.

They found that these bowel cancers switch on a survival mechanism when they are treated with drugs that target faulty MEK genes. But when the researchers added drugs that also block the MET gene, the bowel cancer cells died.

Study author, Dr Sandra van Schaeybroeck, a Cancer Research UK clinician scientist at the Centre for Cancer Research and Cell Biology at Queen's University Belfast and consultant oncologist at the Belfast Health and Social Care Trust, said: "We've discovered how two key genes contribute to aggressive bowel cancer. Understanding how they are involved in development of the disease has also primed the development of a potential new treatment approach for this disease."

Charity calls for bowel cancer test rule change

A new report from Bowel Cancer UK says lives could be saved by relaxing the rules governing who GPs can refer for urgent bowel cancer tests.

The charity suggests there are also problems with waiting times, and with the quality of tests carried out when doctors have significant worries about bowel cancer.

The report - Diagnosing Bowel Cancer Early: Right Test, Right Time - found a third of patients sent for an endoscopy had seen a GP more than three times before being sent to a specialist.

And almost half of them were found to have cancer, according to the country-wide survey based on 708 responses and carried out in September 2013.

When referring patients suspected of having cancer, current guidelines allow doctors to flag a patient as either urgent or non-urgent when they refer them. But GPs are only allowed to send people for 'urgent' bowel cancer tests if they have symptoms graded as 'high risk' or 'alarm', such as bleeding.

But Bowel Cancer UK says only one in every two people eventually diagnosed with cancer initially goes to a doctor with symptoms that would allow urgent tests.

Oesophageal

New test follows the molecular footsteps that lead to oesophageal cancer

A new diagnostic test may be around the corner thanks to the discovery of a gene mutation that marks the progression from a harmless oesophageal condition to cancer, according to research published in *Nature Genetics*.

Scientists funded by Cancer Research UK's Catalyst Club, and working as part of the International Cancer Genome Consortium (ICGC), have identified the faults that signal the early onset ofoesophageal cancer.

Over time, frequent acid reflux – often called heartburn – damages the cells in the oesophagus. If left untreated, this can lead to a condition called Barrett's oesophagus, which in turn can be a precursor of oesophageal cancer. But most people with Barrett's oesophagus won't develop oesophageal cancer – highlighting the need for a test to identify people at risk.

By sequencing DNA in patients with Barrett's oesophagus and those with oesophageal cancer, the researchers have been able to map out the genetic similarities and differences between the two. They found mutations in the gene TP53 in oesophageal cells that were progressing into cancer, offering a way of spotting patients who could be treated to stop the disease before it starts.

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Barrett's oesophagus often goes undiagnosed, making it difficult to identify those people who are at higher risk of going on to develop oesophageal cancer.

The cytosponge, or 'sponge-on-a-string', test involves swallowing a capsule attached to a piece of thread. Inside the capsule is a sponge and, when the capsule reaches the stomach, the outer covering of the capsule dissolves. A nurse then pulls the sponge out, which collects cells for testing as it passes up the oesophagus.

The Cytosponge test, which is still under development, could be used to look for mutations in TP53 as a way of identifying patients whose cells show changes that are likely to develop into oesophageal cancer.

Bladder

New target for aggressive bladder cancer

An international team of scientists have discovered a faulty process in certain bladder cancers that could point to new ways to treat patients with an aggressive form of the disease.

The researchers focused on a more advanced stage of bladder cancer known as 'muscle-invasive' cancer, which means it has begun to spread to the muscle layer of the bladder.

Treatment for muscle-invasive bladder cancer can involve surgery to remove part or all of the bladder. But in around one in two people who have surgery, the cancer can return at a later date.

Researchers from the Institut Curie in France analysed genetic data on invasive bladder tumours from nearly 400 patients.

They discovered a subgroup of these cancers where a particular pathway, known as the EGFR pathway, was hyperactive. This subgroup made up about a quarter of the muscle-invasive bladder tumours analysed.

One of the roles of EGFR is to control the growth and development of cells. Drugs that target EGFR, known as EGFR inhibitors, have already been developed to treat breast, lung and bowel cancers.

Publishing their findings in the journal Science Translational Medicine, the team found that in mice with this subgroup of bladder cancer, treatment with EGFR inhibitors slowed the growth of tumours.

The team, which includes experts from the University of York, believe the findings could help identify which patients might benefit from this treatment in the future.

Other

Use of health and social care by people with cancer

The Nuffield Trust.

This report presents the results of a study into the primary, secondary and social care use of people diagnosed with cancer. Improved survival rates, earlier detection and an ageing population have led to cancer incidence increasing, but it is now seen as a chronic condition rather than necessarily a fatal illness. This shift has led to a growing focus on survivorship, and on the long-term needs of those living with and after cancer. To find out how this impacts on the use of health and social care services, the study used data linkage methods to track the patterns of service use across health and social care in the year after people were diagnosed with cancer. It shows clear evidence of a social services response to a person being diagnosed with cancer. Read the report summary here

Waiting to Benefit.

Macmillan Cancer Support.

Thousands of cancer patients wait for six months or more for disability benefits. At least 4,500 cancer patients (29%) have waited six months or more to find out whether they will even be awarded their disability benefit Personal Independence Payment (PIP) after claiming. A quarter (25%) of those who have started their claim are currently stuck in the system as they wait at least six months for the initial assessment. These delays are in addition to the lengthy three-month wait cancer patients are forced to endure before they are even eligible to apply for PIP2. Under the previous system the average time taken to receive a decision about the Disability Living Allowance (DLA) took just 11 weeks. Now the process is taking far longer with cancer patients waiting an average of 19 weeks without receiving any decision.

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What cancer statistics are available and where can I find them? (June 2014)

This document aims to provide an overview about cancer statistics, including information on the latest statistics publicly available and where to find them. This is intended to be a useful reference guide for infrequent users of cancer statistics or for audiences that may not be familiar with this information. This document is structured using key chapters in the Improving Outcomes: a Strategy for Cancer.

Cancer Research UK gears up to tackle early diagnosis challenge with an extra £20million per year

Cancer Research UK has set its sights on transforming the outlook for cancer patients with the announcement of an additional £20million per year dedicated to diagnosing cancers earlier.

Despite the continued improvements in cancer treatments in the last 40 years, too many people are diagnosed at a stage when it is too late for their cancers to be cured.

Diagnosing cancers at an early stage leads to a radical improvement in survival chances. But the only way to crack this is through research to develop new tests and technologies, alongside research to understand why the UK lags behind other countries.

Figures published by Cancer Research UK in May show that ten year cancer survival has doubled from around 24 per cent in the early 1970s to 50 per cent today. But the latest figures also show that 30 per cent of patients still die within a year.

The charity's ambitious new strategy aims to make more progress in the next 20 years so that three in four people survive their cancer.

Cancer rate rise linked to lifestyle choices

There has been a rise in rates of lifestyle-linked cancers in England.

Liver cancer rose substantially over the past decade - by 70 per cent among men and 60 per cent among women between 2003 and 2012. It now stands as the 18th most common form of cancer in the country, according to new figures by the Office for National Statistics (ONS).

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Rates of malignant melanoma, the most dangerous form of skin cancer, have risen by 78 per cent among men and 48 per cent among women over the same period. Now around 11,300 people are diagnosed with malignant melanoma each year in England, making it the fifth most common cancer.

The main causes of liver cancer are tobacco, infections with hepatitis B and C ,and excess alcohol consumption.

Overexposure to the sun has for some time been known to be a major factor in skin cancer cases. Experts have attributed the rise in skin cancer to the popularity of package holidays over the last 50 years.

The ONS also said that rates of lung cancer – more than 8 out of ten cases of which are caused by smoking – increased by nearly a fifth (18 per cent) among women between 2003 and 2012, although they dropped by 8 per cent in men.

The figures suggest that thousands of cancer diagnoses could be avoided each year if the population cut down on cigarettes and alcohol, ate more healthily and reduced the amount of time they spent in the sun.

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The evidence you need

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Key Journals

British Journal of Cancer: http://www.nature.com/bjc/index.html

Journal of Clinical Oncology: http://jco.ascopubs.org/

The Cancer Journal: http://journals.lww.com/journalppo/pages/default.aspx

The Lancet Oncology: http://www.thelancet.com/journals/lanonc/issue/current

Cancer: http://onlinelibrary.wiley.com/doi/10.1002/cncr.v120.4/issuetoc

BMC Cancer: http://www.biomedcentral.com/bmccancer/

Breast Cancer Research and Treatment: http://link.springer.com/journal/volumesAndIssues/10549

Breast Cancer Research: http://breast-cancer-research.com/

Cancer Nursing Practice: http://rcnpublishing.com/journal/cnp

European Journal of Cancer: http://www.ejcancer.com/

Journal of Cancer Research and Clinical Oncology: http://www.springer.com/medicine/oncology/journal/432

Information within this bulletin covers May/June/July 2014 and draws from a number of sources including Cancer Research UK, NICE Evidence Search and Macmillan Cancer Support. The full text of research referred to is available on request.