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Replacement body parts offer active old age for future pensioners

Generation set to live to 100 will benefit from £50m bio-technology research project

Sarah Boseley, health editor
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Older people who suffer from painful joints will have them replaced, say scientists. Photograph: Barry Austin/Getty Images

Expect not only a ripe old age but a fit and active old age. The launch of a research initiative on regenerative medicine is allowing everyone to be as active in their old age as they were in their first.

More than half of all babies born today are expected to live to 100, but according to research published recently, arteries furl up and teeth fall out, and many will be a happy one.

At the University of Leeds, the country's world leader in artificial joint replacement, a research project that aims to give people 50 active years after 50.

The bionic pensioner of the future could last for 50 years instead of 20, with no need for replacement kneecaps. He or she might have patches on their arteries. Crucially, the research has been developed to ensure the body does not reject the replacement as if they are its own.

Funding of £50m has come from research councils, charities and industry. The aim is to bring together scientists and turn their discoveries into real applications.

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Experts develop new body parts

REPLACEMENT body parts that last for 50 years, instead of 20, will be available to people aged 50 and over, say scientists. The research, which is being funded by research councils, charities and industry, aims to bring together scientists and turn their discoveries into real applications.

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THE TIMES Spare parts that could keep us active

Scientists concentrate on raising quality of life

Sam Lister-Health Editor

Hip joints? Check. Knee ligaments? Check. Heart valves? Check. It is the MoT that will last you a lifetime, and such are the advances in the science of "spare parts" that researchers claim it will help you live beyond the age of 100.

A £50 million, five-year programme announced today will focus on developing biomedical engineering solutions to the problems faced by Britain's ageing population, which could keep the average person active into their second century.

The work, which will be co-ordinated by the Institute of Medical and Biological Engineering (IMBE) at the University of Leeds, aims to tackle ten challenges that will allow people "50 active years after 50".

These include the regeneration of heart valves, the creation of vein repair patches, new ligaments and cartilages, off-the-shelf spare skin and replacement joints that do not wear out. The scientists hope that most will be achievable by 2015.

John Fisher, Professor of Mechanical Engineering and research leader, said that while improvements in healthcare, diet and lifestyle were helping us to live longer, human bodies were still degenerating with age, reducing a person's quality of life and ability to contribute to society.

He said that the research would focus on the areas most affected by age — joints, spine, teeth, heart and circulation — developing new technologies for tissue engineering and regeneration, longer-lasting joint replacements and spinal interventions.

The work, which will be funded by research councils, charities and industry, comes as one study suggests that more than half of babies born now in Britain and other wealthy nations will live beyond their 100th birthday.

Among the IMBE projects currently under way is the creation of "regenerative" heart valves. Scientists clean a human donor valve of all living cells to create a "scaffold" that will not be rejected by the recipient's body. They then insert the valve into the patient.

Riding towards a century

Helping yourself ...

Diet A balanced and varied diet provides the essential vitamins and nutrients your body needs to regenerate, stave off disease and prevent weight gain. High sugar, salt and fat diets can increase blood pressure, cholesterol levels and the risk of chronic disease.

Exercise As well as maintaining correct weight and muscle tone, regular exercise reduces the risk of minor and chronic illness, improves physical strength and mental wellbeing. Insufficient exercise can lead to obesity, doubling your risk of heart disease, stroke, type 2 diabetes and puts increased stress on joints.

Smoking The body begins a healing process almost immediately when you stop smoking. Blood oxygen levels return to normal after eight hours and within 72 hours breathing becomes easier. After five years, the risk of heart attack is half that of a smoker and by ten years the risk of lung cancer is also significantly reduced.

Vitamin D Produced naturally by the human body on exposure to sunlight. Studies have shown those with a correct level of the vitamin are less likely to suffer from osteoporosis or joint pain and are even less susceptible to certain types of cancer.



...and how new medical techniques will help you

Heart Replacement heart valve created by taking donor valve and cleansing it of all cellular material removing of rejection. A tissue scaffold, which remains, is placed in the body where it grows round and strengthens it.

Veins create cell graft scar tissue

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taken forward by a spin-off company called Tissue Regenix, is being developed to mimic the biomechanical and biological environment in the body and grow other soft tissue such as ligaments and blood vessels.

"We are talking about biological scaffolds as therapies that support and regenerate repair. Once one of these implants is in the patient a lifetime," Ingham said.

One of the current options in use because it requires lifelong medication therapy, while a donor valve may only last ten years before rejection. But you are using a remodelling

ceramic, more. It will be created as such as we minimise it. Professor executive of technology, said it is ensuring it is a later quick.

Over the programme, the products are getting better. "These are available and turn the Professor I

These "biological shells", which could be for knee, ankle or hip ligaments, as well as blood vessels and heart valves are then transplanted into the patient whose own body then invades them replacing the removed cells with their own.

The technique, which could be available within five years, effectively allows the body to grow their replacement and removes the need for anti-rejection drugs.

It is similar to the recently developed system of using stem cells to regrow organs outside the body, but costs about a tenth of the price.

"We are all living longer," said Professor John Fisher, who is overseeing the project.

"But our bodies are wearing out at the same rate. We now want a more active lifestyle in our old age."

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'Grow your own body parts' could herald of the active centenarian

Scientific advances including techniques allowing patients to grow new joint bodies will allow the elderly to remain active well beyond their 100th birthday

By Richard Alleyne, Science Correspondent
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British scientists are working on a system which should allow the elderly to buy body parts "off the shelf" and even regenerate their own damaged joints and hearts.

As well as new hardware wearing artificial hip and knee joints, their ultimate ambition is to fix up the body with customised replacement parts grown to order.

They have already carried out human trials on heart valves which are still working four years after they were transplanted.

The Institute of Medical and Biological Engineering at Leeds University believes it could vastly improve the quality of life of our ageing population.

"It is the rise of the bionic pensioner," said Professor Christina Doyle, whose company is working with the university to develop the new technologies.

"The idea is when something wears out your surgeon can buy a replacement off the shelf or more accurately in a bag."

The university is spending £50million over the next five years on the new project designed to allow people to have "50 Active Years after 50".

The focus will be on joints, spine, teeth and jaw, heart and the circulation.

The main thrust of the research centres around a method of tissue and medical engineering which the university is at the forefront of developing.

Led by the immunologist Professor Eileen Ingham they are pioneering a technique of stripping the living cells from donor human and animal parts, leaving just the collagen or elastin "scaffold" of the tissue.

Living cells make up less than five per cent of ligaments, joints and blood vessels and can be "washed away" with special enzymes and detergents.

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DOCTORS: WE CAN KEEP YOU YOUNG



New body parts will reverse signs of age

Cheryl was 'a nervous wreck'

By Victoria Fletcher Health Editor

A MEDICAL breakthrough could see failing body parts replaced with "off-the-shelf" spares. The British finding allows scientists to effectively reverse the ageing process. Wounded hearts and joints, arched backs and damaged blood vessels could be healed naturally. Excited experts say it would allow us to stay fit for "50 years after 50". So advanced is the technology that 40 patients have already had heart valves created. With modern medicine allowing people to live longer, the problem of

how to stay fit good physical at its old age has perplexed scientists for years. Now a team from Leeds Unives says it has created a tech which uses a patient's own cell regenerate the ageing body. They believe hospitals will usually have a stock of pre-prep tissues ready for use on any patient who comes through their door. But the biggest leap forward come with the arrival of "off the shelf" spare body parts. Professor Eileen Ingham, of Institute of Medical and Biol Engineering at Leeds, has created

TURN TO PAGE 5

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Skin tissue fixes organs

20/10/2009 a 21

"Off-the-shelf" tissue taken from humans and animals could soon revolutionise transplant surgery.

Scientists take the donor tissue, such as skin or heart valves, and wash it clean of cells and DNA, which can often lead to rejection.

Surgeons then transplant it, allowing the patient's cells to invade the scaffold - and re-grow it as its own.

Prof Eileen Ingham, of Leeds University, said it can be stored ready to use and its best use so far was for heart valves. She said: "It will last a lifetime."

Focus pays dividends

The '50 active years after 50' initiative was several months in the planning. Tasked with launching a media campaign, we arranged a London press briefing at the Science Media Centre and co-ordinated the materials and information needed to support the event. The launch saw us working seamlessly with the marketing team in the Faculty of Engineering at the University of Leeds, the University's central press office and with academics. The effects of the press briefing were immediate and overwhelmingly successful. In total, we estimate this campaign has generated in excess of £500,000 worth of coverage and is one of the University's most successful media campaigns to date.