

'We can print living tissue'

Picture: UNIVERSITY OF BRISTOL



REVOLUTIONARY: Ben Carter of the University of Bristol team with the 3D printer

EXCLUSIVE

By **Lucy Johnston** HEALTH EDITOR

BRITISH scientists have discovered how to use a 3D printer to create living tissue and hope one day to "print off" human organs.

Researchers at the University of Bristol have developed the bio-ink, created by scientists at the University of Bristol, from stem cells.

It is expected to pave the way for the production of complex tissues to replace diseased or damaged areas of the body such as knees and hips and eventually the creation of vital organs.

Lead researcher Dr Adam Perriman, an expert in cellular medicine at the University of Bristol, said: "This is a very exciting development which we believe could lead to a revolution in the treatment of diseases such as osteoarthritis and other causes of tissue damage.

"This approach is taking the scientific world by storm in terms of its approach to regenerative medicine."

He added: "We believe this work will also help in the development of this new field bioprinting, which

Breakthrough could lead to creation of new organs

can be applied in other areas of medicine, including the treatment of burns, and even the development of organs."

The new bio-ink has already been engineered to create 3D printed tissue structures including a full-size tracheal cartilage ring.

The formulation contains human stem cells – which can convert to other cell types – along with nutrients and molecules called polymers which can change from solid to liquid according to temperature.

The bio-ink is released from a special 3D printer head on to a warm printer base where it turns to a solid gel containing all the ingredients to form living tissue.

Dr Perriman added: "Designing

the new bio-ink was extremely challenging. You need a material that is printable, strong enough to maintain its shape when immersed in nutrients and that is not harmful to the cells. There was a lot of trial and error before we cracked the final formulation."

The team have been able to convert the stem cells into bone building cells called osteoblasts and chondrocytes, which are cells that form cartilage.

These form full tissue structures over five weeks.

Currently researchers in America are using ink-jet printing technology to develop on-site "printing" of skin for soldiers with life-threatening burns.

In this proposed technology, skin cells would be placed directly into a print cartridge, along with essential materials to support them and would be printed directly on the soldier's wound.

Stem cells are isolated from different parts of the body, including bone marrow, and mixed with growth factors and multiplied in a lab.

The cells multiply so rapidly that in about six weeks a layer one cell thick could cover a football field.