

Mind and Body 2025: Story Sheet 1 - George and Ruth



George and the Jogging Cap

George has Alzheimer's Disease, but no-one can really tell because he still manages to live a pretty normal life. Medication has stabilised the dementia so he is unlikely to lose any more brain tissue.

Jennifer, his wife, has tagged all of his clothes with new micro chips so she knows where he is and what he is doing all the time. More to the point, tagging allows George to know where he is and what he is doing. His clothes talk to his mobile phone and the phone co-ordinates much of George's day. Physically, George is in great shape: he runs two miles every day - always a different route, which helps to keep him stimulated. His jogging cap directs him so he never gets lost. He just runs where the hat tells him to.



Ruth

"It's great that Jennifer can keep track of where George is - it means she doesn't have to stay at home with him all the time or put him in a home - but just because she knows where he is doesn't mean that she can stop him falling over or getting mugged"



Katie

"I think it's a bit creepy the way he runs around without knowing where he is going. What if he puts his hat on backwards or something?"



Roy

"Good for George. I think it's so important to keep your independence for as long as possible. And he always seems to be in a good mood."

Ruth and the Tests

Ruth doesn't have time to make an appointment with a GP and hang about in a waiting room full of sick people. She is a partner in a really busy public relations firm; she has clients to meet, designers to brief and staff to supervise.

She's on the go all day, lunch is usually a sandwich in the car. Lately, she has been feeling a little rundown; more than usual. She wants a check-up to make sure everything is OK so she's really pleased with the new range of tests and computer software that can check her over in a few minutes and tell her all she wants to know. She can just drop in anytime for a complete check-up. It's expensive, but time is money.



Katie

"I wish everything at the doctor's could be so simple. I have spent hours and hours in clinics and doctors' surgeries since my daughter Thea had her accident. The trouble is, all the smart new stuff seems to be for well-off healthy people."



George

"You can't beat the personal touch. My doctor always renews my prescription, but we also have a little chat about things and I find it reassuring that she is taking an interest and looking out for me."



Roy

"I don't trust all these machines and things; it doesn't seem right to me. When I go to see the doctor, I want to see a doctor. If there is some serious news, I want a proper doctor to look me in the eye and tell me."

George and the Jogging Cap: Where we are now



GPS (Global Positioning System) receivers are already used in hand-held and in-car navigation devices. These use signals from satellites to pinpoint the users exact location, any time, anywhere.

Similar systems could be incorporated into clothing as new materials are developed, for example jackets and jeans are already available with controls for an iPod built in. Scientists have developed special materials that switch from electrical insulator to conductor in an instant when you press them. This means keyboards, buttons and knobs can be made from these woven materials, and worn and used. Electronics companies have also made light emitting textiles that can be worn or used as home furnishings. You could soon display moving images on your sofa or T-shirt.

Clothes, including caps, made from this kind of material could respond to changes in their surroundings and also transmit and receive radio signals. People are already talking about whether wearable and washable computers could be possible using Smart and Interactive Textile technologies (SMIT).

Clothes might be tagged using Radio-frequency identification (RFID) tags, which broadcast information about the garment.

Drugs are now available that can slow the rate of memory loss in early stage Alzheimer's patients. The same drugs are also reported to improve long-term memory in healthy people without Alzheimer's. Some experts predict that 'cognition enhancers' (drugs that help us to think better) like this will soon be commercially available.

Ruth and the Tests: Where we are now



Very small sensors have already been developed that people with diabetes can have implanted under the skin. The sensors constantly check their blood sugar levels and can trigger an alarm when they are too high, so that the diabetic person can take insulin to guard against losing consciousness. Researchers have also created a colour-changing contact lens that detects someone's blood sugar levels.

Soon it may be possible to link sensors to a system that corrects the problem by automatically administering the right amount of insulin. Smart implantable insulin pumps could be widely available in about five years. These can either be implanted in the abdomen or worn outside the body, and are effectively an artificial pancreas.

In the future the appearance of the eye could be used for the early diagnosis of diseases like Alzheimer's disease and diabetes. Such assessments could be made by patients wherever they are and sent electronically to their doctor.

Technologies are also being developed which will make it possible for patients to use a 'lab-on-a-chip' in their own home to carry out lots of different tests on their own blood, urine, sweat or tears and to send the results straight to their own doctor or a specialist in a hospital. This could make finding out what diseases people have quicker and more reliable, especially if the data is analysed using new kinds of software that are being developed which can successfully sift through huge amounts of information about a person and identify useful patterns and trends.

Mind and Body 2025: Story Sheet 2 - Roy and Katie



Roy and the New Heart

Roy is seventy and has just retired from work. He has always been a fit and strong man, but never been very interested in exercise regimes or going to a gym.

When he retired he went for a full medical with the doctor and heard some bad news. Apparently, his heart has developed a slight irregularity which will probably lead to something more serious, and he has been told he will probably have a heart attack in the next five years. As luck would have it, Roy is still covered by his former company's health insurance, and the company is willing to pay for a new heart to be grown and fitted. Today Roy and his wife, Cynthia, are going to the clinic to view the half grown heart.



Ruth

"I hope I never need a transplant; but if I do, I want a new organ of my own, not something second hand and not properly looked after."



Katie

"I'd like to be getting a new heart, especially one with greater capacity, then I could really improve my running."



George

"Next time I see the doctor I want to ask her about Roy's heart. I was wondering if they can grow new brain tissue in the same way. That would really help me."

Katie and the Doctors

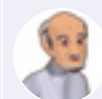
Katie is a single mum. Her daughter, Thea, is nearly eight. Katie is very fit and proud of it. She does lots of sport and especially likes running marathons.

Unfortunately, Thea is unable to do many of the things her mother would like her to be able to do. A car crash when she was three left her with an injured spine and damage to other parts of her body. She has limited mobility and sometimes uses a wheelchair. Soon, Thea will be old enough to have some of the personal enhancement therapies that are becoming available. Katie will have to choose between 'standard enhancement' that will give Thea similar mobility to other girls of her age and 'premium enhancement' that will mean Thea could be an athlete. But premium enhancement is expensive - where will Katie find the money?



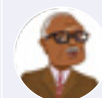
Ruth

"I'm considering a couple of little enhancements myself. Nothing radical, but I could do with a bit of help. And facelifts are SO 20th Century."



George

"I've managed to keep fit and healthy without any enhancement. It's not that hard to take care of yourself, you just have to find the time. Now, if I could enhance my memory, that would be something."



Roy

"It's a disgrace what young people get up to these days, taking drugs to help with exams. And now they want to enhance their bodies in all kinds of new ways. What's the matter with hard work?"

Roy and the new Heart: Where we are now



In 2006 seven children with bladders damaged by a disease called spina bifida were given the first transplants of bladders that had been grown in the laboratory from their own cells. Growing body organs using a patient's own cells means you don't have to find a matching organ from a recently dead donor, it also gets around the problem of the body rejecting organs when they are transplanted from other people.

Stem cells, a special kind of cell found in embryos and in our bones, can, with the right chemical instructions, become one of many different kinds of cells found in our bodies, including those found in the heart. A technique very similar to ink-jet printing has already been developed to spray cells onto soft scaffolding without damaging them. So it may become possible to grow hearts by spraying stem cells onto carefully moulded scaffolding and then giving them the signal that makes them become the cells of a new heart.

Stem cells from human embryos are a potential source for regenerative medicine and tissue replacement. No approved medical treatment has yet been derived from embryonic stem cell research. Some countries have halted embryonic stem cell research, or the production of new embryonic stem cell lines - getting these cells involves either harvesting from embryos a few days old, or therapeutic cloning. Therapeutic cloning involves taking genetic material from a cell in an adult's body to fuse with an empty egg cell. The new cell can be made to develop into an embryo; this is how Dolly the sheep was made.

Katie and the Doctors: Where we are now



A microchip has been invented that can send and receive signals from nerve cells - a first step towards designing devices that combine electronic components directly with the brain. Sensors have been developed that can pick up brain activity in a monkey and use it to control a robot's limb. Similar technology has allowed a person to pick up a glass using their previously paralysed arm.

This way of mending or improving the messages that are sent between the brain and a particular muscle could be combined with strengthening or rebuilding that muscle using stem cells that have been 'programmed' to become healthy muscle cells. Stem cells are primitive cells with the power to transform into the various cells and tissues found in the human body. There are many types of stem cells, from bone marrow to foetal tissue to embryos.

Stem cells from humans have already been used to repair damaged nerves in mice. The researchers found that the stem cells travel up the spinal cord and develop into several different cell types. The partially-paralysed mice were able to walk again.

Treatments based on these two complementary technologies could be offered to people who suffer from muscle weakness or wasting caused either by injury, illness or genetic disease. It is possible that in the future some treatments could make the muscles or nerves work even better than they did before.