

Life in 2056: longer, healthier - and not alone

- Scientists predict bonding with aliens and animals
- Advances in physics could finally explain big bang

James Randerson and Ian Sample
Thursday November 16, 2006

Guardian

A limitless supply of spare organs, hard evidence for aliens and a machine that puts you in the mind of an animal. These are some of the predictions about the world of 2056 by a batch of the planet's most prominent scientists, including the psychologist Steven Pinker, the philosopher Dan Dennett, the astronomer royal, Sir Martin Rees, and the architect of the Beagle 2 Mars mission, Colin Pillinger.

New Scientist magazine has assembled their thoughts to mark its 50th anniversary, and high on the list was proof that we are not alone.

A visit from little green men in flying saucers seems unlikely by 2056, but the experts are convinced the universe will soon feel a less lonely place. Freeman Dyson at the Institute for Advanced Study in Princeton is undeterred by our failure to find any cosmic neighbours so far. He told the magazine: "That proves life is rarer than we hoped, but does not prove that the universe is lifeless." Once we find proof of extraterrestrials, further discoveries will follow quickly, as we will know what we are looking for, he said.

Paul Davies, a physicist at Arizona State University in Tempe, speculated that we may not have to look far. "There could be aliens right here, under our noses. Most life is microbial, and you can't tell just by looking whether a microbe is 'our' life or alien," he said. "The search for terrestrial aliens has only just begun. If they are here, they could be identified soon."

"How different might alien life be?" asked Chris McKay at NASA, "It might be as different as English and Chinese."

Life on Earth will also be transformed, scientists predict, with farms designated to grow human organs. By 2056, even the most sophisticated medicine of the 20th century will begin to look barbaric.

There will be no need to take transplant organs from dead people, according to Bruce Lahn, a human geneticist at the University of Chicago. Instead, human organs will be grown in animals such as pigs. "When a patient needs a new organ - a kidney, say - the surgeon will contact a commercial organ producer and supply them with the patient's immunological profile ... One organ that is probably off limits though is the brain."

Another way forward is drugs to regrow lost limbs and organs. "Advances in heart regeneration are around the corner, digits will be regrown within five to 10 years, and limb regeneration will occur a few years later," Ellen Heber-Katz at the Wistar Institute in Philadelphia told the magazine. "Within 50 years whole-body replacement will be routine."

Fertility treatment and our understanding of sexual reproduction could see science transform sex just as the invention of the pill caused a revolution for the baby-boomer generation. Carl Djerassi at Stanford University, co-inventor of the pill, predicts that women will routinely extend their reproductive lifespan by a decade or more by storing ovarian tissue or eggs extracted in their youth.

Scientists also expect major advances in the understanding of sexual pleasure and sexual health problems, according to Beverly Whipple, secretary general of the World Association for Sexual Health. She told New Scientist of her hopes to see sexual health recognised as a universal human right. "Sexual violence and abuse will be eliminated, universal access to sexual health education will be promoted, and the spread of sexually transmitted infections will be halted," she added.

Advances in particle physics, astronomy and astrophysics may finally shed light on where life, the universe and everything came from.

Nearly 14bn years ago, the universe exploded into being and has since cooled and expanded, leaving clumps of matter we see as planets, stars and galaxies. But the cause of the big bang, what existed before it and what fills much of the universe are still

mysteries. "We can say with confidence what the universe was doing one second later, but our best theories all break down at the moment of the big bang. There is good reason to hope that this will change," said Sean Carroll, theoretical physicist at Caltech.

Sir Martin Rees, the astronomer royal, hopes we will also know whether ours was just one of a series of big bangs. "The decades to come might very well be when the human race finally figures out where it all came from," said Dr Carroll.

As science unravels the mysteries of the universe, humans will take their first tentative steps to set up colonies away from Earth, according to J Richard Gott, an astrophysics at Princeton University. "Establishing a self-supporting colony on Mars ... would provide a life insurance policy against whatever catastrophes might occur on Earth," he told the magazine.

It might not lead to an elixir for life, but by 2056, scientists anticipate unravelling the crucial complex molecular mechanisms that govern wear and tear in our cells, causing damage that manifests as ageing. Richard Miller, professor of pathology at the University of Michigan, envisages "the first class of centenarians who are as vigorous and productive as today's run-of-the-mill sexagenarians".

Sticking his neck out among the future-gazers is Daniel Pauly, director of the Fisheries Centre at the University of British Columbia, with predictions of a device allowing humans to experience the emotions and "fleeting, inarticulate thoughts of animals".

Rather than ushering in an era of obedient pets and happy cattle, Dr Pauly sees it as the saviour of the oceans and the demise of meat-eating humans. "It would cause, obviously, a global revulsion at eating flesh of all kinds, and we would all become vegetarians," he told the magazine.

Guardian Unlimited © Guardian News and Media Limited 2006