FAITH VALUE

Did religion arise to protect us from disease?

www.nature.com/news

D. BOITEAU/ALAMY

ONEGEOLOGY

SNAPSHOT Earth rocks

The mid-ocean ridge in the Atlantic Ocean, the Rocky and Andes mountain chains along the west of the Americas, the Himalayas in Asia and the Great Rift Valley in Africa can all be seen in the first digital geological map to span the globe.

OneGeology, a global collaboration of computer and Earth scientists, has integrated national and regional geological surveys to produce a free resource that colour-codes the planet by rock age. For example, yellows represent rock from the Miocene epoch; greens are from the Cretaceous period; blues are Jurassic; and pinks are Triassic.

So far, detailed data are available for 29 countries, as well as less-detailed global and regional maps. The maps could reveal local hazards such as sources of radioactive

radon emissions and potential landslides, help identify mineral and freshwater extraction sites, and clarify offshore territorial boundaries.

Katrina Charles

Nerve cells made from elderly patient's skin cells

Skin cells from an elderly patient with amyotrophic lateral sclerosis (ALS) have been 'reprogrammed' to generate motor neurons, the type of nerve cells that die as the disease progresses.

It is the first time that an induced pluripotent stem (iPS) cell line has been created from a patient with a genetic illness (J. T. Dimos *et al. Science* doi:10.1126/science.1158799; 2008). Like embryonic stem cells, iPS cells have the potential to develop into almost any of the body's cell types and offer new disease insights.

The researchers, led by Kevin Eggan of the Harvard Stem Cell Institute in Cambridge, Massachusetts, and Christopher Henderson of Columbia University's Center for Motor Neuron Biology and Disease in New York, made the iPS cells using viral vectors to introduce four genes into skin cells taken from two elderly patients with a mild form of ALS (also known as Lou Gehrig's disease). This genetic reprogramming technique was first developed in 2006 by Shinya Yamanaka of Kyoto University in Japan.

The study shows that iPS cells can be made even from octogenarians with a chronic neurodegenerative disease, although making human iPS cells may be more difficult the older the patient is. Eggan's team was able to generate seven cell lines from the 82-year-old and one

line from her 89-year-old sister — the team went on to characterize just the former's cells.

The paper is expected to be the first in a wave of publications describing the generation of iPS cells from patients with specific diseases. Although results are not yet reported in the peer-reviewed literature, posters at a stem-cell meeting in June described iPS cell lines from people with Alzheimer's disease, Down's syndrome, muscular dystrophy, and more.

Such cell lines could be most useful for diseases that are hardest to research. For example, in ALS, because the dying neurons reside within the spinal cord, they are nearly impossible to study in living patients, says Henderson. "We now have cells in culture that are genetically the same as in those with the disease."

About 2% of ALS patients have mutations in the *SOD1* gene, but in the vast majority the cause is unknown. Mouse models to study the disease depend on limited mutations in this single gene and they do not capture the variations or symptoms seen in individuals. Eggan's team has already collected skin samples from patients with more severe forms of ALS; generating iPS cells from more patients should uncover other genetic and environmental triggers for the disease.

Don Cleveland, an ALS researcher at the

University of California, San Diego, says the results are impressive, but the team still needs to use those iPS-generated cells to "decode the pathways through which mutations cause damage to motor neurons". The researchers must establish "whether immature neurons really reflect the inherited damage that follows only after decades in the human", he says.

The researchers admit that the cells need to be further characterized before they will provide information about disease — Eggan says they should have some answers within months. "We have laid the groundwork for the types of assay that we should do with these cells, and now we're going to do it."

The golden test for clinical use would be to see whether transplanting such cells into patients could alleviate disease — encouraging results have been reported of iPS cell transplants in mouse models of Parkinson's disease and sickle cell anaemia. Cleveland points out that no one has yet been able to create functional motor neurons. And the cell lines created by the team would in any case be unsuitable for therapeutic use in humans, because at least one of the four genes used to program them has a known link to cancer.

Monya Baker

See News Feature, page 682.