Petri dish spinal cord grown from stem cells

Most efforts to grow tissues and organs rely on biodegradable scaffolds. When 'seeded' with a patient's stem cells, these scaffolds provide a surface for the cells to latch on to and provide them with nutrients. The scaffold delivers the signals needed for the stem cells to differentiate along the correct path, and its structure coaxes them to form tissue of the right shape.

Nervous tissue is extremely complex, however. It starts off as a flat sheet of cells on the top surface of the embryo, called the neural plate, which, through a series of elaborate deformations, buckles and folds in on itself to form a hollow tube. One end of this neural tube will eventually form the brain, and the other the spinal cord. This complexity makes scaffolds unsuitable for growing nervous tissue, as they cannot be manufactured in the intricate shapes needed.

Andrea Meinhardt of the Dresden University of Technology and her colleagues therefore exploited a property of stem cells known as self-directed morphogenesis, first discovered by the late Yoshiki Sasai. About 10 years ago, Sasai and his colleagues developed a method for growing embryonic stem cells in three-dimensional suspension, and found that cells grown in this way can, when fed the right combination of signalling molecules, go through the motions of development and organize themselves to form complex tissues such as eyes, glands and bits of brain.

Read full, original article: Scientists create lab-grown spinal cords