News Front Page
World
UK
England
Northern Ireland
Scotland
Wales
Business
Politics
Health
Medical notes
Education
Science/Nature
Technology
Entertainment
Also in the news
---
Video and Audio
---
Have Your Say
Magazine
In Pictures
Country Profiles
Special Reports

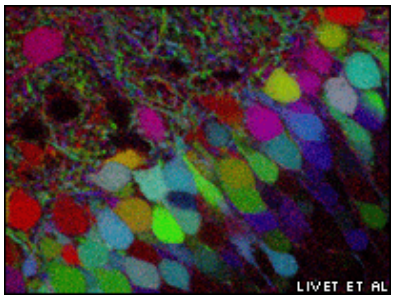
RELATED BBC SITES
SPORT
WEATHER
CBBC NEWSROUND
ON THIS DAY
EDITORS' BLOG

Last Updated: Thursday, 1 November 2007, 00:30 GMT

E-mail this to a friend Printable version

# Cell stains create a 'brainbow'

**Scientists have used the latest cell-staining techniques to create a colourful "brainbow" of the tissues of the brain.**




The future of brain imaging

OPEN Enlarge Image

The Harvard University team used a combination of multiple fluorescent proteins to colour brain cells (neurons) up to 90 distinct colours.

Until now, fluorescent labelling has been able to produce just a handful of shades, the Nature report says.

The new method could aid research into the circuitry of the nervous system.

It is hoped it will enable scientists to gain a greater understanding of how brain wiring goes awry in many different diseases.

> **"We have already used brainbow to take a first peek at the nervous system of mice, and we've observed some very interesting, and previously unrecognized, patterns of neuron arrangement"**
>
> Professor Joshua Sanes
> Harvard University

It could also potentially help track the development of the nervous system, and give new insight into the origins of brain disorders.

Researcher Dr Jeff Lichtman said: "In the same way that a television monitor mixes red, green, and blue to depict a wide array of colours, the combination of three or more fluorescent proteins in neurons can generate many different hues.

"There are few tools neuroscientists can use to tease out the wiring diagram of the nervous system.

"Brainbow should help us much better map out the brain and nervous system's complex tangle of neurons."

**Gene mix-up**

The brainbow technology uses a system for mixing up genetic material known as Cre/lox in a new way to shuffle genes encoding green, yellow, orange, and red fluorescent proteins.

Each time the system was used it produced a different

SEE ALSO
Scan shows how brains plot future
02 Jan 07 | Health
Brain scan 'can read your mind'
09 Feb 07 | Health
Brain scan 'tracks Alzheimer's'
13 Jul 06 | Health

RELATED INTERNET LINKS
Nature
Harvard University
Medical Research Council's Centre for Developmental Neurobiology
The BBC is not responsible for the content of external internet sites

TOP HEALTH STORIES
How Hep C bypasses cell defences
Patients 'denied intensive care'
Pre-eclampsia link to heart risk
News feeds

MOST POPULAR STORIES NOW
MOST E-MAILED | MOST READ
X Factor Emily pulls out of show
Dead UK woman's throat was cut
'Cremated son' later found alive
Man arrested over officer crash
Tennis coach jailed for sex abuse
Most popular now, in detail

pattern of genes, which then produced a wide range of colours when the material was inserted into individual neurons.

Dr Jean Livet, who also worked on the study, said: "The technique drives the cell to switch on fluorescent protein genes in neurons more or less at random.

"You can think of brainbow almost like a slot machine in its generation of random outcomes, and Cre/lox is the hand pulling the lever over and over again."

The researchers used brainbow to examine neural circuits in mice over a period as long as 50 days.

**'Scratching the surface'**

Professor Joshua Sanes, another member of the research team, said: "We have already used brainbow to take a first peek at the nervous system of mice, and we've observed some very interesting, and previously unrecognized, patterns of neuron arrangement."

But he added: "As far as understanding what we're seeing, we've only just scratched the surface."

Professor Ian Thompson, from the Medical Research Council's Centre for Developmental Neurobiology at King's College London, said the new method gave a much clearer way of identifying not only individual neurons, but also the connections they make with other nerve cells.

Potentially this could be of great help in monitoring the recovery of the brain from a stroke, for instance.

He said: "Most of the circuitry of the nervous system has been worked out by looking at one or two cells at a time, and building up from there.

"This gives us the possibility of looking at whole populations of cells at the same time."