

# MailOnline

## See how a fish thinks! Incredible video that shows a thought swimming through the brain of a Zebrafish

- Video shows the reaction in a fish's brain to the sight of food
- Scientists believe technology could help develop drugs or even read minds

By [Emily Davies](#)

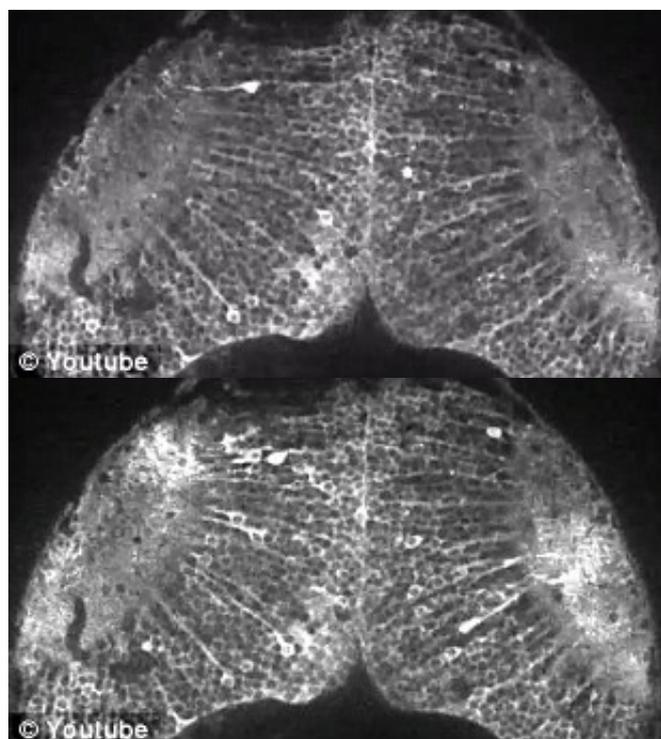
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A video showing a fish's reaction to food as a fluorescent visual representation has been published by researchers.

The short clip shows parts of the zebrafish's brain lighting up in purple as a a paramecium - a single celled organism which the fish eats - is introduced into its environment.

The discovery was made by a group of scientists from Japan's National Institute of Genetics who were the first to capture thoughts of a living creature on video in real-time.

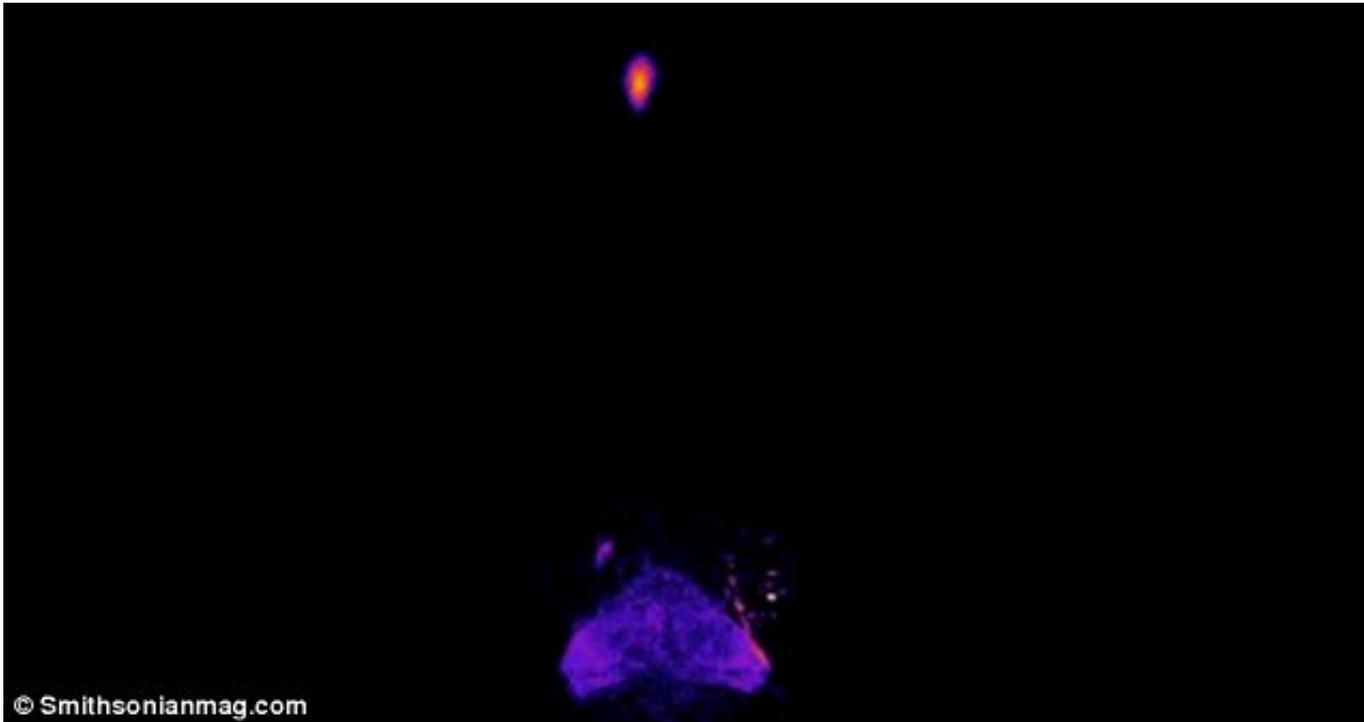
**Scroll down for video**



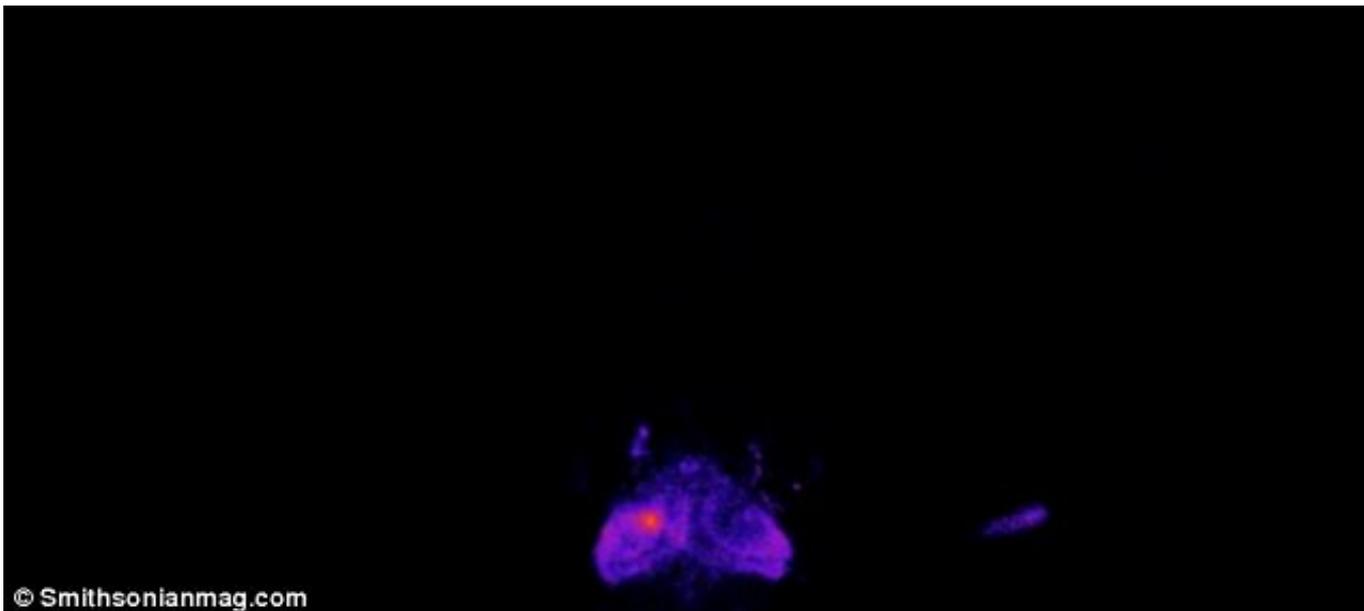
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Image of an idea: Different parts of the Zebrafish's brain light up as it thinks about eating its lunch

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**Stunning footage: The video shows the fish's brain glowing as the paramecium is introduced into the environment**



**Scientists used a gene called GCaMP which reacts to the presence of calcium by increasing in fluorescence**

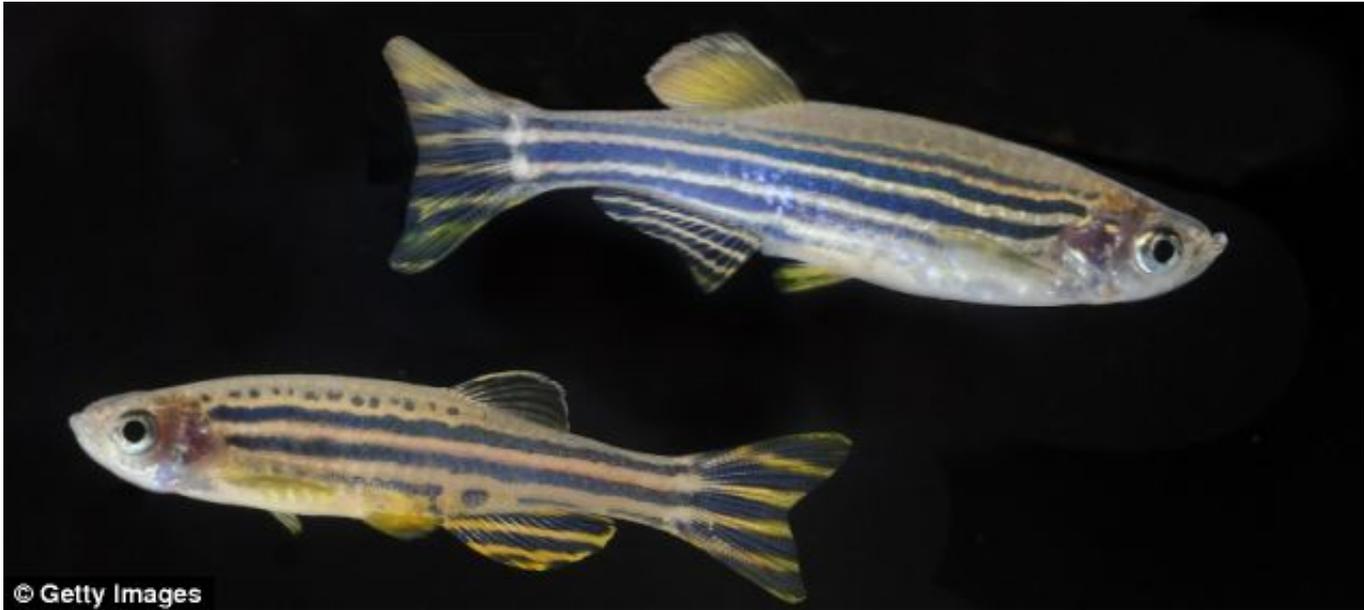
The key to the technology is a gene called GCaMP which reacts to calcium ions by lighting up.

The concentration of calcium ions increases with neuron activity, so the GCaMP gene makes parts of the fish's brain glow brightly when the fish reacts to movement.

A probe which detects fluorescence was used so that scientists could capture the fish's mental reaction to seeing the food.

Scientists had already identified which neurons respond to movement in the brain of the transparent zebrafish.

By using the GCaMP gene and the probe they could track those parts of the brain as they were activated by seeing the movement of the paramecium.



### Genes inserted into zebrafish helped to track their reaction to movement of paramecium

When the paramecium moved from right to left, the neuron activity moved from left to right, because of the way the brain's visual map is reversed when compared to the field of vision.

Images of animal's thoughts have been captured before, but this video is the first time responses have been recorded as a real-time video.

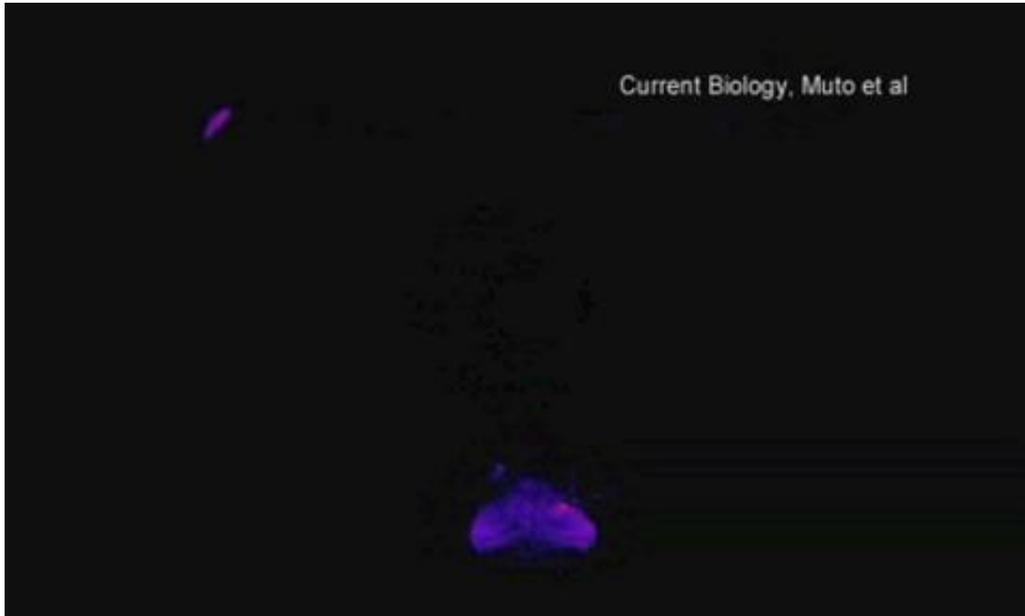
The researchers accomplished this by developing an improved version of GCaMP that is more sensitive to changes in calcium ion concentration and gives off greater levels of fluorescence.

It is hoped the technology could be used to map which parts of the brain are affected by chemicals under consideration for new drugs so that psychiatric medications could be developed more easily.

Scientists also speculate that the procedure could be used to detect thoughts. One of the paper's co-authors said: 'In the future, we can interpret an animal's behaviour, including learning and memory, fear, joy, or anger, based on the activity of particular combinations of neurons.'

## **Video The brain of a Zebrafish reacts to paramecium movements**

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