

Flies get 'mind-control sex swap'

By Rebecca Morelle

Science reporter, BBC News

Scientists have been able to take control of flies' brains to make females behave just like males.

Researchers genetically modified the insects so that a group of brain cells that control sexual behaviour could be "switched on" by a pulse of light.

The team was able to get female fruit flies to produce a courtship song - behaviour usually only seen in males.

The study, published in the journal *Cell*, suggests that the wiring in male and female flies' brains is similar.

Gero Miesenboeck, from Oxford University, UK, who carried out the research with J. Dylan Clyne from Yale University, US, said: "It is often the case that males have to work very hard to convince females to mate with them. "In many animal species, males have to put on elaborate courtship displays to impress females - even the tiny fruit fly."

Male fruit flies will vibrate one of their wings to produce a barely audible song, explained Professor Miesenboeck.

"And if the female likes that sound, she'll surrender to his advances."

Previous research has revealed that a group of 2,000 brain cells are necessary for this courtship behaviour in the insects; however, both male and female fruit flies appear to possess most of these neurons. Professor Miesenboeck said: "It looks like males and females have very similar neuronal equipment, yet they behave so differently - only the male sings, and only the female responds to the song by allowing a male to copulate with her.

"The big question is: why - what is the difference?"



“What would happen if we turned the neurons on in females”

Gero Miesenboeck

To investigate, the team placed some flies in a "mini sound studio".

The insects had been genetically modified so that a pulse of light would activate this group of courtship neurons.

What happened when scientists took over the flies' brains?

First of all, the researchers looked at male flies and found that the light would indeed spark a song.

"The second, more exciting question we wanted to ask, was what would happen if we turned the neurons on in females.

"Females don't normally show this kind of behaviour, but we wanted to find out if they had a hidden capacity to do it," explained Professor Miesenboeck.

As the light pulsed through the chamber, video footage shows the female fruit fly lifting and vibrating one of her wings to produce a song.

The next stage was to find out how effective the artificially induced songs were as mating calls.

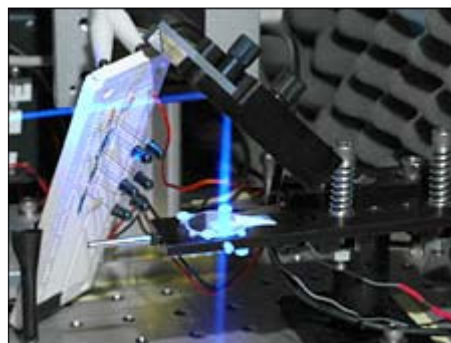
For this, the "Cyrano de Bergerac" test was applied

The 'Cyrano de Bergerac' test: how alluring is the song?

A male and female fly were placed in the sound studio. The male fly had had his wings altered so that he could not produce any sound.

The mute couple were then played the recorded courtship songs produced by the mind-controlled male and female flies.

"The artificially activated male songs proved seductive," Professor Miesenboeck told the BBC News.



The flies were placed in a mini

less well controlled."

Nevertheless, the researchers say the study reveals that male and female brains are extremely similar in flies - even the circuits thought to be dedicated to sexual behaviours such as courtship.

The next question to answer, said Professor Miesenboeck, was if both males and females had the capacity to create courtship songs, why was it that only the males did so under normal circumstances?

He said he thought there might be a handful of "master switches" or "command centres" in the flies' brains that were set to male or female mode.

"Our next goal is to find these switches," he added.