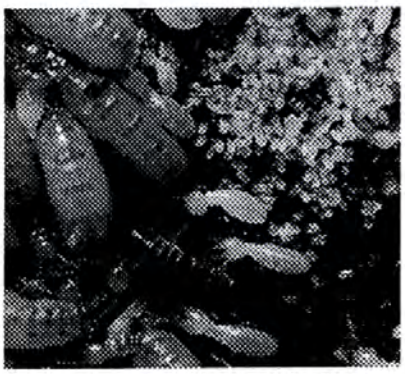
'Queen pheromone' controlling termite reproduction found, pest control uses expected



A group of giant queen termites, left, a black, striped king termite and smaller worker termites. Eggs can be seen in the top right corner. (Photo courtesy of Kenji Matsuura)

Researchers have identified the fruit-scented components of the "queen pheromone" that queen termites give off to control the reproductive capacity of each colony.

Queen termites are apparently preventing other females from becoming new queens by giving off a fruit-like odor. Researchers expect that by artificially creating the same pheromone, termites can be controlled effectively.

A termite colony consists of king, queen and worker termites, with only queens producing eggs. When queens die or become sterile, several other females in the same colony become new queens to take over reproduction. However, as long as there are a sufficient number of eggs in the colony, queens will not increase.

What kind of chemicals were contributing to maintaining this biological mechanism had been a mystery for 50 years.

A research team led by Okayama University associate professor Kenji Matsuura collected 100 queens from each of two termite colonies in Okayama Prefecture and analyzed a small amount of a substance they produced.

As a result, the researchers identified that one secreted substance contained two aromatic components found in fruit -- one contained in fruits like apples and bananas, and the other found in grapes.

When researchers placed each of these chemicals close to the group of worker termites in the absence of a queen, the number of females transforming into new queens increased. However, when the chemicals were mixed together and placed near the colony, the number of new queens stopped increasing. Based on the results, the research team concluded that these two components form the "queen pheromone."

Matsuura says the number of queens in each colony varies depending on the size of nest, and is apparently controlled using the queen pheromone to avoid producing too many eggs for worker termites to look after.

The artificial queen pheromone will effectively prevent female termites from transforming into new queens and laying eggs to reform a colony, researchers said.

The findings were published in the online version of the journal Proceedings of the National Academy of Sciences of the United States of America on July 6.

Click here for the original Japanese story

(Mainichi Japan) July 11, 2010

Green fingers

In Focus

Photos: A roaring good time: Dinosaur exhibit comes to Roppongi Hills office tower

Photos: The traditional decorative touch

Videos

Todai-ji temple video tour

Most Read Today

1. World's largest flower blooms in Tokyo
2. Japanese woman dies, 42 injured in Swiss train accident
3. English teacher used 'hangman'-like game at school where student hung himself
4. Foreign criminals building up Japanese operations, threatening public order: NPA
5. English teacher used 'hangman'-like game at school where student hung himself

Market & Exchange Rates

Nikkei	2010/07/23 15:29
9430.96(+210.08)	
Yen/Dollar	2010/07/22
86.96 yen	
Yen/Euro	2010/07/22
112.08 yen	

Wireless reading devices discussed in MDN advisory panel meeting

Chromosome size differences may affect meiosis and genome size.

Wang J, Chen PJ, Wang GJ, Keller L

Science 2010 Jul 16 **329**(5989):293 [abstract on PubMed] [citations on Google Scholar] [related articles] [full text] [order article] Citeulike

Selected by | Helen Chamberlin NEW
Evaluated 26 Jul 2010
Relevant Sections

Faculty Comments & Author Responses

Faculty Member	Comments
Helen Chamberlin Ohio State University, USA Developmental Biology New Finding	**I liked this article because it identifies an unexpected phenomenon that can ultimately influence the genome size of a species. It also raises important unanswered questions about the cell-wide mechanisms that coordinate meiosis.** The genome size of different multicellular eukaryote species can vary across four orders of magnitude {1}. While several specific cellular mechanisms that lead to increased genome size are understood, mechanisms that can systematically lead to a decrease in genome size are less clear. The authors discover such a mechanism in the hermaphrodite (XX)/male (XO) nematode C. elegans. They show that in male meiosis – if two homologous autosomes are of different length - the longer autosome preferentially segregates away from the X chromosome. The net effect is that the hermaphrodites that typically contribute to subsequent generations will preferentially receive the shorter chromosome, ultimately leading to a smaller genome size within the population. The results provide an interesting exception to independent assortment, and highlight that we still have much to learn about the cell-wide surveillance mechanisms that guide meiosis. References: {1} Gregory TR, Animal Genome Size Database, 2010 http://www.genomesize.com (Accessed 26 July 2010). **Competing interests:** None declared Evaluated 26 Jul 2010 NEW How to cite this evaluation

Faculty Comments & Author Responses

How to cite the Faculty of 1000 Biology evaluation(s) for this paper

1) To cite all the evaluations for this article:

Faculty of 1000 Biology: evaluations for Wang J et al *Science* 2010 Jul 16 329 (5989) :293 http://f1000biology.com/article/id/4324979/evaluation

2) To cite an evaluation by a specific Faculty member:

Helen Chamberlin: Faculty of 1000 Biology, 26 Jul 2010 http://f1000biology.com/article/id/4324979/evaluation