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## Horizontal transmission of symbiotic microbes by the termite *Neotermes koshunensis*(Shiraki)

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**PG-5            Horizontal transmission of symbiotic microbes by the termite  
*Neotermes koshunensis* (Shiraki)**

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The relationships between termites and gut microbes are frequently depicted as a typical example of symbiosis. Despite the generally perceived vertical transmission of symbiotic microbes by termites, it still remains unclear whether all the microbes are transmitted from parents to offspring. Here we investigated the occurrence of horizontal transmission of methanogenic microbes by the termite *Neotermes koshunensis*. Firstly, we examined for methanogens *N. koshunensis* colonies, which are supposed to sometimes lack methanogens, by epifluorescence microscopic observation and 16S rRNA gene PCR amplification. Methanogens were detected from some colonies by both the methods while they were not detected at all from the other colonies. Hereafter, the former is referred to as MC (methanogen colony) and the latter as MFC (methanogen free colony). Termite individuals of a MFC were found to become harboring methanogens in their guts after being kept together with a single individual of a MC for two weeks. The results indicate that the gut environments of the MFC individuals are not necessarily unsuitable for methanogen growth and strongly suggest the complete absence of methanogens in the guts of the MFC. Furthermore, this disproves the claim of the vertical-transmission of all the symbiotic microbes by *N. koshunensis*. As another experiment, termite individuals of a MFC were kept with those of methanogen-harboring *Coptotermes formosanus* colony or with filter papers that contain gut contents of a MC. In both the cases, methanogens appeared in guts of the termite individuals of a MFC. These combined, it is probable that methanogen-harboring colonies of any termite species as well as the environments surrounding the termites are potential sources of methanogens for MFCs. Accordingly, it is predicted that a longer elapsed time of *N. koshunensis* colonies will increase the chance of contact with methanogen sources under natural conditions; our field observation showed that mean population size was apparently, though not significantly, different between MCs and MFCs. The present study suggests that the transmission of symbiotic microbes by *N. koshunensis* involves not only vertical mode, but also both horizontal mode (including that mediated by environments) and vertical mode.