京都大学若手人材海外派遣事業　ジョン万プログラム
研究者派遣プログラム

英文報告書

提出日：平成24年1月8日

1．渡航者　（日本語）			
氏　　名	柳川　綾	採択年度	H24 年
部　　局	生存圏研究所	電　話	
職　　名	助教	メール	
研究課題名	Disease resistant behavior in insect:昆虫の病気感染抵抗行動		
海外渡航期間	平成　25 年 3 月　31 日～　平成　24 年 12 月 28 日		
渡航先 （英語表記）	国名：France 大学等研究機関名： National Center for Scientific Research 研究室名等： Laboratoire Evolution Genomes et Speciation 受入研究者名：Frederic Marion-Poll		

2．渡航の報告　（英文）

渡航先の研究環境、研究者との交流、研究発表の状況等、渡航中の滞在経験について英語（500～1000語）で記述して下さい。受入研究者と撮影した写真や研究発表で用いた図等について、可能な範囲で別添として提出して下さい。ページ数については増加してもかまいません。

この報告は、ジョン万プログラムの成果として、京都大学ホームページ（英文）などに掲載されることがあります。

This project examined the behavioral reaction of Drosophila toward chemical compounds of bacteria to clarify the role of insect hygiene behavior as a disease resistant behavior.

Previously, we found that touching Drosophila by surface compound of bacteria can induce cleaning behavior; grooming behavior in *Drosophila melanogaster*. This cleaning behavior was not induced by sugar, but induced by bitter chemicals and surface compounds of bacteria. During this stay, we have developed our study to confirm the function of taste receptor on induction of grooming behavior.

We examined the genes involved in the detection of bacterial compounds (LPS), by looking at mutants of gustatory receptor genes belonging to the family of Grs. The results using the mutant flies (Taste mutant; Poxn 40, mutant of bitter taste; ΔGr33a, ΔGr47a, ΔGr66a, Gr66a-Gal4 x UAS-DTI, mutant of sugar taste; ΔGr64f, ΔGr61a, ΔGr64a, EP-5, Gr5a-Gal4 x UAS-DTI, ionoptopic receptor; IR76b-Gal4 x UAS-DTI, IR52a-Gal4 x UAS-DTI, water cell related gene; ppk28-Gal4 x UAS-DTI) indicated that this behavioral induction was strongly related with taste genes, especially the taste receptors on wing. Also we observed the Gr genes expression on wing taste sensilla by confocal microscope. However, since the results from Gr expression were too complicated to clarify the taste function, we employed an optogenetic approach to

demonstrate that activating neurons expressing sugar or bitter receptors by light (by expressing CHR2 ectopically) also triggers grooming thus confirming the primary role of taste in this behavior. These results strongly supported the importance of taste stimuli on the induction of grooming behavior.

Today, very few data are available concerning the role of behavior of insect resistance against infection by microbes (Roy et al., 2006). In my research on termites in Kyoto University, termites which clean themselves are less susceptible to entomopathogenic fungi and this behavior were enhanced by odor stimulus. It is thus important to understand which stimuli trigger this behavior in insects, in order to either use more appropriate fungi or to find new ways to use them as a biological control agents.

Roy, H. E., D. C. Steinkraus, J. Eilenberg, A. E. Hajek, and J. K. Pell 2006. BIZARRE INTERACTIONS AND ENDGAMES: Entomopathogenic Fungi and Their Arthropod Hosts. Annu. Rev. Entomol. 51: 331-357.