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学位論文内容の要旨

Abstract of the dissertation

博士の専攻分野の名称：博士（獣医学）氏名：アッバス ラグダ モハメド ファトヒ アハメド

Name ABBAS RAGHDA MOHAMED FATHI AHMED

学位論文題名

The title of the doctoral dissertation

Verification of genetic loci responsible for the resistance/susceptibility to the Sendai virus infection using congenic mice

(コンジェニックマウスを用いたセンダイウイルス感染抵抗性／感受性遺伝子座の証明)

< abstract >

Sendai virus (SeV) is one of the most important pathogens in the specific-pathogen free rodents. It is known that there are some inbred mouse strains susceptible or resistant to SeV infection. The C57BL/6 (B6) and DBA/2 (D2) mice are representatives of the resistant and susceptible strains, respectively. Previous study with the quantitative trait locus (QTL) analysis identified three QTLs responsible for resistance or susceptibility to SeV infection on different chromosomes and indicated that resistance or susceptibility to SeV infection was almost predicted by genotypes of these three QTLs. To verify the above hypothesis, congenic lines were generated as follows; B6-congenic lines carrying one of the D2 alleles of three QTLs and combination of these three QTLs, and D2-congenic lines carrying single or combination of B6 alleles of three QTLs. All these congenic lines were then challenged with SeV infection and survival rate as well as the immune cellular responses were investigated to verify that these three QTLs were responsible for the difference in resistance/susceptibility to the SeV infection between B6 and D2 mice.

D2 congenic lines introgressed single or combination of B6 alleles of QTLs changed to resistance to SeV infection. Especially, a D2 triple-congenic line became resistant as similar level to B6-parental strain. However, B6-congenic lines introgressed single or combination of D2 alleles of QTLs all remained to be resistant to SeV infection. Both IL-6 and TNF-α in broncho-alveolar lavage fluid (BALF) of D2 triple-congenic line decreased to the similar level of B6 mice, suggesting that this is a part of factors that D2 triple-congenic line became resistant to the similar level of B6 mice. In addition, the body weight loss, viral load, immune cells in BALF, and histopathological index of SeV-infected male D2 triple-congenic mice were comparable to those of B6 mice except for the number of neutrophils in BALF. In contrast, female D2 triple-congenic mice were divided into survived and non-survived mice after SeV infection and it could be identified by the extent of body weight loss. Viral load and macrophage number in BALF in SeV-infected female D2 triple-congenic mice were comparable to those of B6 mice, whereas the number of total cells, neutrophils, and lymphocytes in BALF were remained in the level of D2 mouse. There was a correlation between body weight loss and these immune cellular responses in SeV-infected female D2 triple-congenic mice.

Data obtained from these congenic mice verified that three QTLs identified previously were indeed responsible for the resistance/susceptibility to SeV infection in B6 and D2 mice. As well, the introgression of B6 alleles of these three QTLs into D2-genetic background resulted in resistance to SeV infection by optimizing the aggressive immune cellular responses that seen in D2 mice, although there may be other loci responsible for difference between B6 and D2 mice.

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学位論文内容の要旨

Abstract of the dissertation

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