69) Defense Mechanism against Infection with *Listeria Monocytogenes* in Spontaneously Hypertensive Rats with T-cell Depression.

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We have been analysing the characteristics of immunological impairment in spontaneously hypertensive rats (SHR). In the experiment presented here, the interactions taking place between immune T-cells and macrophages(M ϕ) and T-cell independent defense system mediated by Mo have been investigated by using as antigen the intracellular pathogen *Listeria monocytogenes* (LM).
(Materials and Methods)

Three-month-old female SHR and W rats were used. Rats were iv injected with 10^5 - 10^9 viable LM (16-1684 strain) for primary infection and with 10^9 viable LM for secondary infection. To suppress the activity of M ϕ , rats were ip injected with 5mg of carragheenan 2 days before the injection of LM.
(Results)

In the groups of SHR and W rats that received an iv injection of viable LM, none of the rats died from the injection of 10^5 - 10^8 viable LM. On the other hand, all SHR and W rats died from the injection of 10^9 viable LM within 3 days of the infection. To determine whether immunity to LM develops after the primary infection, the SHR and W rats which survived were iv reinjected with 10^9 viable LM 4 weeks after the primary infection. The groups of SHR did not acquire anti-*Listeria* immunity and all died about 3 days after the secondary infection. In sharp contrast, the groups of W rats resisted completely the challenge from lethal numbers of LM except that 2 out of the 5 rats which had resisted the primary infection with 10^9 LM died. These results clearly indicate that SHR have an able enough mono-nuclear phagocyte system to prevent the primary infection with sublethal numbers of LM but are lacking the efficient interactions between T cells and M ϕ which are required for the acquisition of resistance to the secondary infection with lethal numbers of LM. On the other hand, the T-cell response following infection with LM takes time to develop. *Listeria*-specific T cells are not demonstrable in rats infected with LM during the first two days after infection. Thus, any resistance expressed before that time must depend on the T-independent defense system, which is mediated by resident M ϕ . When we compared the growth kinetics of LM in the spleens and livers of SHR and W rats infected with 10^7 LM, we found that on the 1st day they grew at an equal rate in both strains. However, the numbers of viable LM present in the tissues of SHR were significantly fewer on the 2nd and the 3rd days than in the tissues of W rats. This suggests that SHR are more resistant to infection with LM than W rats, presumably because of the possession of a more active M ϕ system. To confirm the enhanced activity of resident M ϕ in SHR, the resistance to infection with LM in SHR and W rats pretreated with carragheenan was investigated. Carragheenan-treated SHR died only after infection with 10^8 LM and resisted the infection with 10^7 and lower numbers of LM, whereas the treated W rats succumbed to infection with 10^7 and 10^8 LM. This result indicates that resident M ϕ of SHR were more resistant to carragheenan treatment and eventually killed 10 times more LM than that of W rats were able to do.
(Summary)

T-cell dependent and independent resistance to *L. monocytogenes* were studied in SHR with congenital T-cell depression. The results presented here indicate that SHR have a nonspecifically activated macrophage system able to resist primary infection with *L. monocytogenes* but are lacking the interaction between T-cells and macrophages which are required for the acquisition of anti-*Listeria* immunity.