Title: Efficacy of a heptavalent CTL minigene vaccine against infection by *Chlamydia pneumoniae* in young and aged C57BL/6 mice

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Experimental intranasal inoculation of C57BL/6 mice with *Chlamydia pneumoniae* results in respiratory infection that clears in most young animals within 28 days. Pulmonary infection is associated with local production of IL-12 and TNF-α. In young (2-6 months of age) C57BL/6 mice infected intranasally, extra-respiratory spread to the cardiovascular system is a common event. In 20 month old C57BL/6 mice, we observed increased mean titers of organism in both the lung and heart/ascending aorta at Day 14 post-infection, when compared to 6 month old counterparts. At Day 28 post-infection, despite clearance of organism from the lungs from 5 of 7 (71%) young C57BL/6 mice and 4 out of 8 (50%) of aged C57BL/6 mice, organism could still be detected in the hearts/ascending aortas of all mice, regardless of age. Thus, advanced age is associated with an increased burden of infection in the respiratory and cardiovascular systems at Day 14. Advanced age, however, does not appear to substantially alter ultimate resolution of the respiratory infection or the establishment of a high titer infection in the cardiovascular system. Finally, a heptavalent CTL epitope minigene vaccine protected both aged and young C57BL/6 mice from detectable respiratory infection for at least the first 14 days after challenge with 5x10⁵ IFU *C. pneumoniae*. However, by 28 days post-infection, a subset of vaccinated mice, regardless of age, showed low titers of *C. pneumoniae* in the lung, suggesting that vaccination may not completely protect against the development of a chronic or persistent infection. Moreover, it appears that while the vaccine delays extra-respiratory spread to the cardiovascular system in both young and old mice, by Day 28, virtually all mice regardless of age or vaccination status had established infection in the heart/ascending aorta. These results suggest that the vaccine may be protective against respiratory infection in young and aged animals, but is likely to be ineffective in prevention of extra-respiratory spread of the organism.