

In vitro and in vivo Infectivity of Coxiella burnetii Strains from French Livestock

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Abstract : Q fever is a worldwide zoonosis caused by the gram-negative obligate intracellular bacterium *Coxiella burnetii*. Following the recent outbreaks in the Netherlands, a hyper virulent clone was found to be the cause of severe human cases of Q fever. In livestock, Q fever clinical manifestations are mainly abortions. Although the abortion rates differ between ruminant species, *C. burnetii*'s virulence remains understudied, especially in enzootic areas. In this study, the infectious potential of three *C. burnetii* isolates collected from French farms of small ruminants were compared to the reference strain Nine Mile (in phase II and in an intermediate phase) using an in vivo (CD1 mice) model. Mice were challenged with 10⁵ live bacteria discriminated by propidium monoazide-qPCR targeting the *icd*-gene. After footpad inoculation, spleen and popliteal lymph node were harvested at 10 days post-inoculation (p.i). The strain invasiveness in spleen and popliteal nodes was assessed by qPCR assays targeting the *icd*-gene. Preliminary results showed that the avirulent strains (in phase 2) failed to pass the popliteal barrier and then to colonize the spleen. This model allowed a significant differentiation between strain's invasiveness on biological host and therefore identifying distinct virulence profiles. In view of these results, we plan to go further by testing fifteen additional *C. burnetii* isolates from French farms of sheep, goat and cattle by using the above-mentioned in vivo model. All 15 strains display distant MLVA (multiple-locus variable-number of tandem repeat analysis) genotypic profiles. Five of the fifteen isolates will be also tested in vitro on ovine and bovine macrophage cells. Cells and supernatants will be harvested at day1, day2, day3 and day6 p.i to assess in vitro multiplication kinetics of strains. In conclusion, our findings might help the implementation of surveillance of virulent strains and ultimately allow adapting prophylaxis measures in livestock farms.

Keywords : Q fever, invasiveness, ruminant, virulence

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