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Non-invasive monitoring efficacy of antibacterial therapy through a novel biomarker

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Brucellosis is an important zoonosis causing huge economic losses worldwide. Treatment is ineffective and animals remain carrier lifelong. S19 and RB51 are live attenuated strains of *Brucella abortus*. However, S19 induces only antibody, ineffective for the intracellular pathogen. RB51 induces cell mediated immunity (CMI) but is rifampicin resistant. Both are secreted in milk and can infect humans and cause abortions in animals. Phage lysed bacteria (lysates) retain maximum immunogenicity as opposed to killing by heat or chemicals. We report here immunotherapy of bovine Brucellosis by phage lysates of RB51 (RL) and S19 (SL). The SL induced strong antibody response and RL stimulated CMI. *In vitro* restimulation of leukocytes from RL immunized cattle induced interferon gamma production. A single subcutaneous dose of 2 ml of cocktail lysate (both RL and SL), eliminated live virulent *Brucella* from Brucellosis affected cattle with plasma level of *Brucella* specific 223 bp amplicon undetectable by RT-PCR and blood negative for live *Brucella* by culture in 3 months. The untreated controls were strongly positive for 223 bp amplicon and were positive by culture. This is the first report on monitoring the efficacy of antibacterial therapy employing plasma RNA specific for live bacteria as a non-invasive biomarker.

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