

JOINT EVENT

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Studies on application of bacteriophages in diagnosis, therapy and prophylaxis of brucellosis and pasteurellosis in animals**Hari Mohan Saxena, Sugandha Raj and Sabia Qureshi**

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Brucellosis is a dreadful zoonotic disease affecting domestic animals and humans leading to huge economic losses to livestock industry. Currently there is no satisfactory therapy for bovine Brucellosis and the affected animals become carrier for life. We have isolated a new broad acting lytic brucellaphage and explored the immunotherapeutic potential of phage lysed *Brucella* organisms (phage lysates) prepared by lysing organisms of *Brucella abortus* attenuated strains S19 and RB51 with the lytic phage. S19 lysate (SL) induced antibody and phagocytic response while RB51 lysate (RL) generated cellular immune response in Brucellosis affected cattle. A single subcutaneous dose of two ml of cocktail lysate (both RL and SL) eliminated live virulent *Brucella* from affected cattle in three months with plasma level of *Brucella* specific 223 bp amplicon becoming undetectable by RT-PCR and blood negative for live *Brucella* by culture. Similar effects on *Brucella* were obtained with phage alone and phage targeted through live S19 organisms also. We have also developed a luminescence assay for detection of *Brucella* organisms in clinical samples from Brucellosis affected cattle based on ATP release by phage lysed bacteria and generation of luminescence by ATP catalyzed luciferin - luciferase reaction. Haemorrhagic septicaemia (HS) is an acute, fatal, septicaemic disease of cattle and buffaloes caused by *Pasteurella multocida*. Alum precipitated heat killed vaccine is not very effective and tests for differentiating infected from vaccinated animals (DIVA) are currently unavailable. We have developed a new candidate marker vaccine against HS by induction of iron uptake receptors on *Pasteurella multocida* and its subsequent lysis by phage. Two prototype companion DIVA assays based on ELISA and Immunoblotting were also developed for differentiating marker vaccinated animals from infected animals by detecting antibodies against iron receptors present in sera of the former but absent in the latter group of animals. Results of our studies in laboratory animals as well as in adult cattle indicate that phage can be applied in therapy, prophylaxis and diagnosis of important bacterial diseases of livestock like brucellosis and pasteurellosis.

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