DBT-NIAB scientists study desi cows to get a drug for TB

New Delhi, July 24: Tuberculosis (TB) is one of the leading causes of death worldwide. There were about 10.0 million new cases and 1.5 million deaths globally in 2018. It is a leading killer of people with HIV and a major cause of deaths related to antimicrobial resistance (AMR). India has the highest burden of the disease with an estimated incidence of about 2.69 million cases.

It has been reported that a considerable proportion of human TB is caused by Mycobacterium bovis, the primary causative bacteria for TB in cows (Bovine TB or BTB). In other words, cows are a major reservoir of zoonotic TB. To make matters worse, TB in cattle is also caused by the human TB bacilli, M. Tuberculosis. TB in cattle and Zoonotic TB in humans presents a unique health challenge in India due to several reasons.

First, there is no vaccine available for BTB; second, the national BTB control programme is yet to be implemented; third, the inability to identify and differentiate M. bovis from M. tuberculosis based on routinely used clinical laboratory procedures prevents true estimation of the incidence of zoonotic TB in human; and fourth, M. bovis is naturally resistant to Pyrazinamide, one of the four drugs used in standard first-line anti-TB treatment regimen. This may preclude the patients from successful treatment and recovery, thereby increasing the chances of transmission and failure to eradicate TB disease completely.

But, on the brighter side, India is also home to the largest cattle population in the world with an array of indigenous and crossbred varieties with enormous genetic variability. Several reports indicated that prevalence of TB is markedly greater in exotic and crossbred cattle compared to indigenous breeds. Hence, finding the key differences in the immune responses that makes an indigenous cow less susceptible to TB will have a huge impact for development of better biomarkers for diagnosis and development of effective vaccines against TB in both animals and humans.

The Department of Biotechnology's National Institute of Animal Biotechnology (DBT-NIAB), Hyderabad, has taken up a study to work on this hypothesis. The project intends to employ a start-of-the art transcriptomic sequencing approach to differentiate the immune responses in indigenous cows in comparison to crossbred cows when they are exposed to TB Infection. The findings from this study will not only help discover a signature of protective immunity guiding to develop appropriate control strategies and vaccines for TB but also help in adopting effective cross breeding policy. Finally, this study will contribute significantly in the research towards control of TB at the animal source to reduce its transmission to humans and thus help to achieve the ambitious goal of zero TB death globally.

DBT has funded a project for a period of three years for this nationally important collaborative project between NIAB and West Bengal University of Animal and Fishery Sciences (WBUAFS).

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