Abstract Group: 10.2. Tuberculosis

Keyword 1: Tuberculosis - diagnosis  Keyword 2: Breath test  Keyword 3: Biomarkers

Title: Detection of volatile organic compounds in cattle caturally infected with Mycobacterium bovis

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Body: We report a novel method in detecting Mycobacterium bovis infection in cattle based on identifying unique VOC (volatile organic compounds) profiles in the breath of cattle. The study was conducted on breath samples collected from cattle on an M. bovis-infected dairy in southern Colorado, USA. All animals were skin test positives; the presence of disease was either confirmed or infirmed after necropsy. Negative controls included breath samples from animals on two tuberculosis-free dairies in northern Colorado. Gas-chromatography/mass-spectrometry analysis revealed significant differences between M. bovis-infected and non-infected animals in the concentrations of 15 VOC's, allowing for distinctly different VOC patterns.

Based on these results, a nanotechnology-based array of sensors was tailored for detection of of M. bovis-infected cattle via breath. The tailored system successfully identified all M. bovis-infected animals (8/8) while 21% (3/14) of non-infected animals were misclassified as M. bovis-infected.

The method shows promise in identifying unique VOC patterns in cattle with bovine tuberculosis. Applicability in humans warrants further study.