Anthrax spore detection by a Luminex assay based on monoclonal antibodies recognizing anthrose-containing oligosaccharides

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The similarity of endospore surface antigens between bacteria of the Bacillus cereus group complicates the development of selective antibody-based anthrax detection systems. The surface of B. anthracis endospores exposes a tetrasaccharide containing the monosaccharide anthrose. Anti-tetrasaccharide mAbs and anti-anthrose-rhamnose disaccharide mAbs were produced and tested for their fine specificity in a direct spore ELISA with inactivated spores of a broad spectrum of B. anthracis strains and related species of the Bacillus genus. Although the two sets of mAbs had different fine-specificities, all of them recognized the tested B. anthracis strains and showed only limited cross-reactivity with two B. cereus strains. The mAbs were further tested for their ability to be implemented in a highly sensitive and specific bead-based Luminex assay. This assay detected spores from different B. anthracis strains and two cross-reactive B. cereus strains, correlating with the results obtained in direct spore ELISA. The Luminex assay (detection limit 10(3) to 10(4) spores per mL) was much more sensitive than the corresponding sandwich ELISA. Although not strictly specific for B. anthracis spores, the developed Luminex assay represents a useful first line screening tool for the detection of B. anthracis spores

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