

### THREE DIMENSION MORPHOLOGY OF *Clostridium botulinum* BY ATOMIC FORCE MICROSCOPE

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The *Clostridium botulinum* (CB) and its neurotoxin can cause the fatal intoxication, which is categorized to as following: foodborne, wound, infant, and toxic infectious botulism. To confirm the CB and its type of toxin, the procedures which through the enrichment, selective culture, and laboratory animal toxicity test spend three weeks conventionally. All of these are complexity and cost, and need the proficient expertise to execute. In this experiment several strains of the living cultured CB were suspended into distilled water containing cover glass. Then the atomic force microscope (AFM) was applied to trace the three-dimensional morphology of CB with a sharp probe while monitoring the interaction forces working between the probe and sample surface. The AFM afforded the results simultaneously which described as below. The rod-shaped CB with peritrichous flagella was visualized in the high resolution three-dimensional images (Fig. 1). The width, length and height of the CB were estimated accurately (Fig. 1). The CB did examine directly without staining nor coating. The terminal endospore of the CB was characterized in three dimension morphology (Fig. 2), which did not detect via usual methods. Several of convex particles on the surface of CB and its flagella were ascribed to the presumptive secretory proteins, yet need further assay to ascertain. The AFM has great potential for providing valuable new information in microbiology, especially for the rapid detection of pathogens in food and clinical specimen.

#### References:

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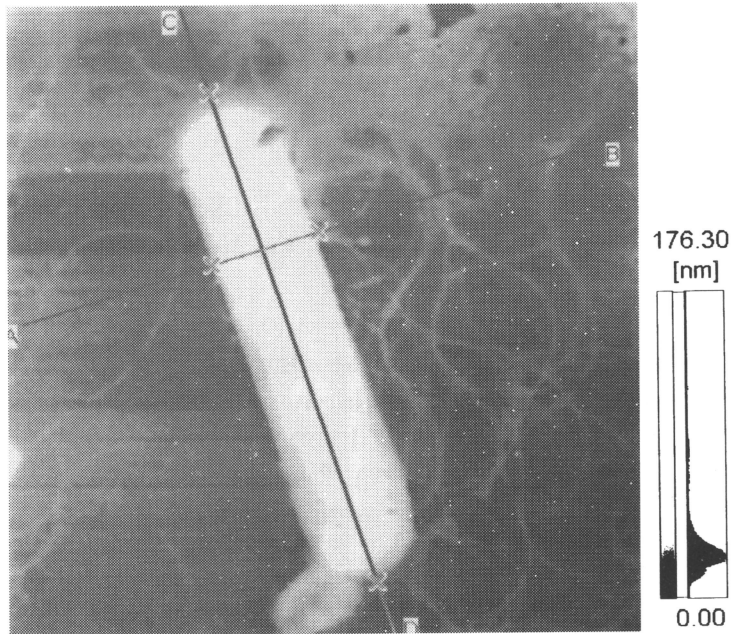


Fig. 1. AFM image of the rod-shaped CB (type A, strain NLFD1986) with peritrichous flagella, which width, length and height were calculated as  $1.31 \times 6.01 \times 0.176 (\mu m^3)$

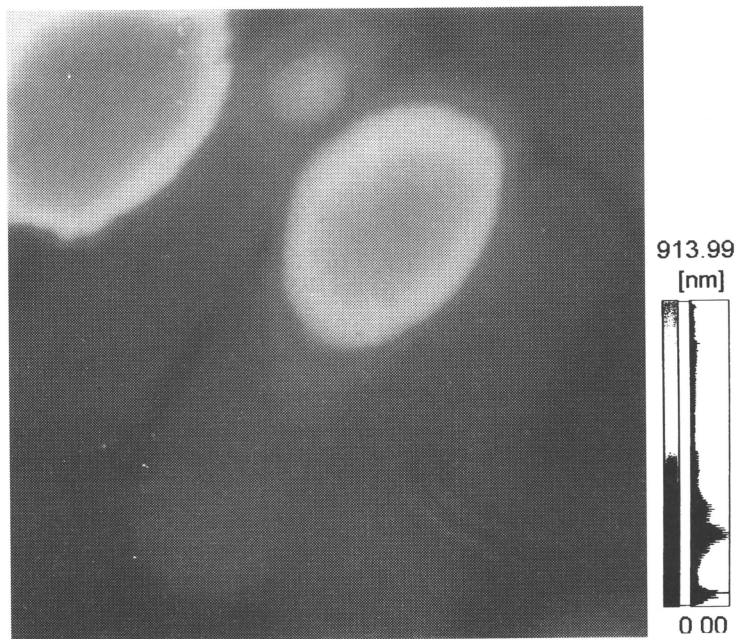


Fig. 2. AFM image for the terminal endospore of the CB (type A, strain DH-2).