The study of the coccoid form and the autolysins of *Campylobacter upsaliensis*

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(ABSTRACT)

Conversion of *Campylobacter upsaliensis* to the nonculturable but viable coccoid form was characterized. Chloramphenicol did not prevent the conversion. Severe decreases in isocitrate dehydrogenase activity and oxygen uptake and extensive degradation of ribosomal RNA suggest that the coccoid form is a degenerative form rather than part of a life cycle. The autolysins of spiral and coccoid forms of *C. upsaliensis* were also studied. Autolytic activity in the soluble and sediment fractions of sonicates of the spiral and the coccoid form of *C. upsaliensis* could not be demonstrated by native (nondenaturing) PAGE. Autolysins were detected, however, by using denaturing SDS-PAGE gels containing either purified *E. coli* peptidoglycan or whole cells of *Micrococcus luteus* as the turbid substrate, with subsequent renaturation by treatment with Triton X-100 buffer. In renaturing gels that contained *E. coli* peptidoglycan, 14 autolytic bands were detected ranging from 200 kDa to 12 kDa. In similar gels containing whole cells of *M. luteus*, only a single band appeared having a molecular weight of 34 kDa. This band corresponded to one of the bands present in the gels containing *E. coli* peptidoglycan. This common autolysin was isolated by adsorbing it from *C. upsaliensis* lysates onto *M. luteus* cells and then subjecting these cells to renaturing SDS-PAGE in gels containing *E. coli* peptidoglycan. The 34 kDa autolysin differed from a single 51 kDa autolysin unique to the *M. luteus* cells. The 34 kDa autolysin was isolated from an SDS-PAGE gel and was pure when tested by isoelectric focusing. The N-terminal amino acid sequence analysis showed the first 15 amino acids of the 34 kDa autolysin to have 67% identity with a part of antigenic protein PEB4 of *Campylobacter jejuni*. The purified autolysin was used to immunize rabbits and the antibodies produced precipitated autolytic activity from cell

lysates. The specificity of the antibodies was shown by Western blotting: only a single specific band occurred, with a molecular weight of 34 kDa, and thus it seems unlikely that the 34 kDa autolysin was derived from any of the other autolysins that were detected.