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Culture Confirmation of *Campylobacter* spp. by Latex Agglutination

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A commercial latex agglutination test [Meritec-Campy (jcl), Meridian Diagnostics, Cincinnati, Ohio] was evaluated for identification of *Campylobacter jejuni*, *C. coli*, *C. laridis*, and other *Campylobacter* isolates. The test had 100% sensitivity in detecting *C. jejuni* and *C. coli* but low sensitivity with *C. laridis* isolates. *C. upsaliensis* strains reacted with the test. The test had 100% specificity for 101 non-*Campylobacter* organisms.

Campylobacter jejuni and *C. coli* are the most common species of the genus *Campylobacter* that have been isolated from stool specimens of patients with campylobacter gastrointestinal infection. Other species such as *C. laridis* (6), *C. fetus* subsp. *fetus* (5), and *C. upsaliensis* (4, 7) are also isolated on occasion. After isolation of the organism by using a variety of selective or nonselective methods, a number of biochemical tests are usually performed to identify the organism to the genus and species level. In addition to biochemical tests for identification of *Campylobacter* species, immunologic reagents are available that can confirm an isolate as being some member of the genus *Campylobacter*. One test, Meritec-Campy (jcl) (Meridian Diagnostics, Cincinnati, Ohio), has been available commercially for some time, but there is little published information regarding the performance of this test. The purpose of this study, therefore, was to assess the performance of the Meritec-Campy test in detecting the most common *Campylobacter* species and to determine the specificity of the test.

Meritec-Campy (jcl) is a latex agglutination assay that is used for culture isolate identification. According to the claims of the manufacturer, the test should identify any *Campylobacter* isolate of the species *C. jejuni*, *C. coli*, or *C. laridis*. With Meritec-Campy (jcl), 108 isolates of *Campylobacter* spp. and 101 isolates of non-*Campylobacter* organisms were tested. All isolates of *C. jejuni* and *C. coli* used were clinical isolates obtained from patients at the Hospital of the University of Pennsylvania (HUP). Two isolates of *C. laridis* were the kind gift of Charlotte Patton, Campylobacter Reference Laboratory, Centers for Disease Control, Atlanta, Ga., and two isolates were from Paul Swenson, Seattle-King County Health Department Laboratories, Seattle, Wash. Two isolates of *C. laridis* were isolated from patients at HUP; one of these isolates had been previously characterized (3). One isolate of *C. fetus* subsp. *fetus* was also obtained from a patient at HUP. All other *Campylobacter* spp. were obtained from Charlotte Patton. *Campylobacter* isolates were identified by using published methods (2). The non-*Campylobacter* isolates were isolated from a variety of clinical specimens taken from patients at HUP. All isolates were identified by biochemical means, using either API 20 (Analytab Products, Plainview, N.Y.) or the Vitek Identification System (Vitek Systems, Inc., Hazelwood, Mo.) or by using additional appropriate biochemical tests.

Campylobacter spp. were grown on brucella sheep blood agar in a microaerophilic environment and were tested after 24 h of incubation. Non-*Campylobacter* isolates were grown under aerobic conditions on Trypticase soy agar with 5% sheep blood (BBL Microbiology Systems, Cockeysville, Md.) and were also tested after 24 h of growth. To test isolates, a single colony (2 mm in diameter), or multiple colonies if colonies were small, was removed from the plate with a wooden applicator stick and mixed with a drop of extraction reagent on a glass slide. A drop of neutralizing reagent was then added (no incubation was necessary), and then 1 drop of immune latex reagent coated with rabbit anti-*Campylobacter* antibodies was added.

After the contents were mixed to give a uniform suspension, the slide was rotated at 100 to 110 rpm by a mechanical rotator for 5 min at room temperature. A test was positive when visible agglutination was observed while the reaction was read under a high-intensity light source. Small amounts of graininess within the milky suspension were considered by the manufacturer to be a negative reaction. Although it was not part of the test procedure, we scored the degree of agglutination as negative, +/− (grainy but also negative), 1+, 2+, or 3+ in order to determine the relative reactivity of different isolates with the latex reagent. Agglutination reactions at 1+ or above were considered positive. A single lot of reagent was used for the entire study (lot no. KQ24003).

The Meritec-Campy (jcl) latex test had 100% sensitivity in detecting *C. jejuni* and *C. coli* but gave negative results with all *C. laridis* strains tested (Table 1). Two isolates of *C. upsaliensis* were also reactive with the latex reagent. Most of the *C. jejuni* and *C. coli* isolates exhibited a 2+ reaction with the latex reagent. In contrast, *C. laridis* strains showed either a +/− or a negative reaction. To determine whether increasing the amount of growth time had an effect on the ability of *C. laridis* to react with the reagent, the six isolates were tested again after 48 h. One of the isolates exhibited a 1+ reaction, but the other five isolates still tested negative. All 101 non-*Campylobacter* isolates had negative reactions, and the test had a specificity of 100%.

The results of this study show that the Meritec-Campy (jcl) latex reagent is sensitive and specific for detecting *C. jejuni* and *C. coli*. However, the latex test exhibited negative or +/− reactions with *C. laridis*, and the results were considered negative in this study. Further modifications of the reagent are necessary to improve sensitivity for that particular species. An additional, unexpected finding was the reactivity of the latex with *C. upsaliensis*. This organism has been described as causing bacteremia and gastrointestinal infections in normal and immunocompromised hosts (4, 7). *C. upsaliensis* is similar to *C. jejuni* and *C. coli* in that it is thermophilic and grows at 42°C. However, it is susceptible

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TABLE 1. Reactivity of Meritec-Campy (jcl) with *Campylobacter* spp. and non-*Campylobacter* isolates

Organism tested	No. tested	No. positive	No. of isolates showing indicated reaction				
			3+	2+	1+	+/−	Negative
Campylobacter jejuni	77	77	7	58	12		
C. coli	17	17		9	8		
C. laridis	6	0			1[a]	4 (5[a])	2
C. upsaliensis	2	2		2			
C. fetus subsp. *fetus*	3	0					
C. cryaerophila	2	0					
C. fennelliae	1	0					
Aeromonas sp.	10	0					
Citrobacter sp.	5	0					
Escherichia coli	8	0					
Enterobacter sp.	9	0					
Enterococcus sp.	2	0					
Hafnia alvei	3	0					
Klebsiella sp.	6	0					
Plesiomonas shigelloides	4	0					
Pseudomonas sp.	9	0					
Salmonella sp.	10	0					
Serratia sp.	5	0					
Shigella sp.	10	0					
Staphylococcus sp.	7	0					
Streptococcus agalactiae	1	0					
Vibrio sp.	8	0					
Yersinia sp.	3	0					

[a] Organisms grown for 48 h and retested.

to most of the antimicrobial agents contained in available selective media and may not be recovered from specimens plated only on selective media (7). The Meritec-Campy (jcl) latex assay appears to be somewhat more specific and easier to perform than another commercial latex assay, Campyslide (BBL Microbiology Systems). Hodinka and Gilligan evaluated the Campyslide test and found that the assay correctly identified *C. jejuni* and *C. coli* to the genus level, although one false-positive reaction with a rough strain of *Pseudomonas aeruginosa* was noted (1). The Campyslide test requires a 30-min extraction prior to testing, although Hodinka and Gilligan found that 1 to 5 min may be acceptable.

The results of this study suggest that the Meritec-Campy (jcl) latex agglutination assay reliably detects an antigen specific to several *Campylobacter* species when isolates from culture plates are tested. Improvement is needed before the assay can be used to detect *C. laridis* isolates. The assay may also be useful for detecting *C. upsaliensis* isolates, but additional strains need to be tested before a recommendation can be made. Biochemical identification is still necessary to identify putative *Campylobacter* isolates to the species level.

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