Location of *Campylobacter jejuni* in Infected Chicken Livers

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To determine whether chicken livers infected with *Campylobacter jejuni* are seeded in vivo or contaminated after slaughtering, 117 livers purchased in retail outlets in New York were examined for surface and tissue infections. Of 56 livers positive for *C. jejuni*, 36 yielded surface growth only, 18 both surface and tissue growth, and 2 tissue growth only. The scanty growth from tissue samples suggests a carry-over of organisms from the surface. It was concluded, therefore, that contamination is most likely due to unhygienic handling of offal. Infection rates of livers varied from retailer to retailer.

Ingestion of undercooked chicken livers infected with *Campylobacter jejuni* has been reported to be a cause of intestinal campylobacteriosis in humans (3). Preliminary investigations in our laboratories have revealed that a substantial proportion of raw chicken livers sold in retail shops in New York are infected with *C. jejuni*. Measures required to prevent transmission of *C. jejuni* infection to humans depends upon the location of the organisms in the organ. If the infection is located in the hepatic tissue, as is often reported in chickens (1, 4, 6) and is probably secondary to bacteremia (4, 5), the burden of providing a clean product falls on the farmer. If, on the other hand, *C. jejuni* occurs in a surface contamination due to unhygienic handling of offal, the clean product is the responsibility of the slaughter house or the retailer or both. To determine the location of the organisms, we examined 117 chicken livers purchased from retail outlets in New York.

Intact livers were placed in sterile petri dishes. After the surfaces were swabbed, the livers were submerged in 70% ethyl alcohol for 1 min, placed on sterile filter paper, and allowed to dry for 3 min. The capsule was removed with sterile instruments, and 2 to 3 g of the tissue was transferred to a sterile container, ground with 3 ml of Mueller-Hinton broth (BBL Microbiology Laboratories, Cockeysville, Md.), and sampled with a sterile swab. Surface and tissue swabs were streaked on Blaser's (BBL) and Butzler's *Campylobacter* agar (Oxoid Ltd., Basingstoke, Hampshire, England). The media were incubated at 42°C for 2 days in an atmosphere consisting of 5% O₂, 10% CO₂, and 85% N₂. Colonies morphologically suggesting *C. jejuni* were picked and identified as previously described (2). *C. jejuni* was recovered from 56 (48%) of the 117 livers. A total of 18 were positive for *C. jejuni* infection in both the surface and tissue, 36

were positive for surface infection only, and 2 were positive for tissue infection only. The remaining 61 livers were entirely negative. The number of *C. jejuni* colonies isolated from tissue was invariably small compared with the many colonies recovered from the corresponding surfaces. Two livers were positive for tissue infection in the absence of surface infection, but in either case, no more than two colonies were observed suggesting that the organisms originated from the surface. Support of this supposition is derived from the following points: (i) numerous colonies would be expected if the organisms originated from an abscess containing live *C. jejuni* organisms, (ii) 96% of the infected livers in this survey showed evidence of contamination after slaughtering, and (iii) neither scarring nor macroscopically overt abscesses were present in any of the livers examined. Taken together, these findings indicate that commercially available chicken livers in New York are contaminated after slaughtering and does not reflect the presence of an in vivo acquired, hepatic *C. jejuni* infection.

The livers were purchased from 15 different retailers. Livers from five of these retailers were consistently negative, whereas contamination rates ranged from 20 to 100% in livers from other shops. Evidently, some retailers successfully control the contamination, whereas others make little or no effort to provide a clean product.

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