

human coronaviruses–229E and –OC43 and severe acute respiratory syndrome–CoV were able to survive in suspension at room temperature for several days (8,9). Moreover, severe acute respiratory syndrome–CoV was completely inactivated after heat treatment at 60°C for 30 min (9).

Human-to-human transmission of MERS-CoV is inefficient, and the transmission route has not yet been revealed. The predominant detection of MERS-CoV by quantitative PCR in nasal swab samples suggests the virus causes upper respiratory tract infection in dromedary camels (3). Which route or combination of routes is responsible for its zoonotic transmission is unclear, and foodborne transmission should not be excluded. Residents of the Arabian Peninsula commonly drink unpasteurized milk. Our results show that MERS-CoV, when introduced into milk, can survive for prolonged periods. Further study is needed to determine whether MERS-CoV is excreted into the milk of infected dromedary camels and, if so, whether handling or consuming contaminated milk is associated with MERS-CoV infection. Recently Nipah virus was transmitted experimentally by drinking, which resulted in respiratory tract rather than intestinal tract infection (10). A similar transmission mechanism for MERS-CoV could result in contamination of the oral cavity and subsequent infection of the lower respiratory tract. Pasteurization of milk can prevent foodborne transmission (9). We showed that heat treatment decreased infectious MERS-CoV below the detection limit of our titration assay, and this might function as a relatively easy and cost-effective measure to prevent transmission.

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## Carbapenemase-producing Organism in Food, 2014

**To the Editor:** Carbapenem antimicrobial drugs are the line of defense against multidrug-resistant gram-negative bacterial infections. The global emergence of carbapenemase-producing organisms is a public health emergency because these enzymes confer resistance to nearly all  $\beta$ -lactam drugs and are often associated with multidrug or pandrug resistance (1). Alarming reports of carbapenemase-producing organisms from environmental and animal sources, including food animals, are increasing (1). Recently, clinical isolates of *Salmonella enterica* serotype Kentucky that produce VIM-2 and OXA-48 were reportedly isolated from patients in France with a travel history to Africa and the Middle East, suggesting foodborne transmission of carbapenemase producers (2).

Table. Antimicrobial drug susceptibility of a VIM-2 producing *Pseudomonas fluorescens*-like organism isolated from food (squid), Saskatoon, Canada, January 2014

Antimicrobial drug	MIC
Ampicillin	>32
Amoxicillin + clavulanic acid	>32
Cefoxitin	>32
Ceftiofur	>8
Ceftriaxone	>64
Azithromycin	16
Chloramphenicol	16
Tetracycline	≤4
Naladixic acid	16
Ciprofloxacin	0.06
Gentamicin	≤0.25
Kanamycin	16
Streptomycin	≤32
Sulfisoxazole	32
Trimethoprim + sulfamethoxazole	0.5
Ertapenem*	>32
Tigecycline*	0.125
Colistin*	3

\*MICs determined by Etest; all others were determined by broth microdilution.

To the best of our knowledge, before this report no foodborne carbapenemase-producing organisms had been identified in Canada and the United States, although the scope of antimicrobial drug resistance surveillance programs is limited to major agricultural products (poultry, beef, and pork) (3,4). In our modern, ethnically diverse societies, niche-market meat products, including imported foods, are becoming increasingly common. Worldwide dissemination of the *Klebsiella pneumoniae*, VIM, OXA, and New Delhi metallo- $\beta$ -lactamase type carbapenemases among humans has been facilitated by intercontinental passenger travel, but the role of the global food trade in this dissemination has not been investigated (5,6). We describe a carbapenemase-producing organism isolated from a squid purchased from the seafood section of a food store.

Among other items, the squid was purchased from a Chinese grocery store in Saskatoon, Canada, in January 2014 as part of a drug-resistance surveillance pilot study. Although no country-of-origin labeling was available for inspection, the store owner reported that, according to the distributor, this squid originated in South Korea. An organism with 95.5% sequence identity to *Pseudomonas fluorescens* was isolated

on Mueller-Hinton agar with 2  $\mu$ g/mL meropenem and identified by partial sequencing of the *cpn60* gene (GenBank accession no. KJ606641). Although the organism was not extensively resistant, it was resistant to all  $\beta$ -lactam drugs tested including ertapenem (Table). PCR amplification and sequencing confirmed that this organism contained VIM-2 carbapenemase (GenBank accession no. KJ625238).

The presence of carbapenemase-producing organisms in the food supply is alarming. Although this organism may not be a pathogen, its contribution to the resistome and the potential for lateral gene transfer to clinically relevant bacteria is certainly a cause for concern. This finding indicates that the risk for exposure to carbapenemases extends beyond persons with particular travel histories, previous antimicrobial drug use, or hospitalization and into the general public. There is an urgent need for expanded resistance surveillance for carbapenemase-producing organisms and their resistance plasmids in food products that are not captured under current programs.

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