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SHORT PAPER
A listeriosis patient infected with two different *Listeria monocytogenes* strains

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SUMMARY

Normally, only one isolate of *Listeria monocytogenes* from a case of listeriosis is subjected to characterization. Here we show that two isolates from different sites of the body were not the same strain. Such a phenomenon may not have any clinical relevance, although it may confuse the epidemiologist trying to match infection source with infection target.

A 56-year-old man was admitted to a psychiatric clinic for treatment of alcoholism known for the last 25 years. He had also an insulin dependent diabetes mellitus. During the previous month, mainly alcohol, but no food, had been consumed. Examination showed raised concentrations of bilirubin (201 μmol/l), C-reactive protein (CRP, 161 mg/l), aspartate- (ASAT, 4·47 μkat/l) and alaninaminotransferase (ALAT, 1·48 μkat/l), but low prothrombin complex (PK, 21–42%). Leucocyte count was $4{\cdot}1 \times 10^9$/l and erythrocyte sedimentation rate (ESR) 92 mm/h. Blood samples did not show any bacterial growth and samples from urine and throat were without significant bacterial growth.

The patient was referred to a medical clinic. The diagnosis was acute alcoholic hepatitis. Treatment was started with lactulose, phytomenadionum, spironolactone, dixyrazine, metronidazolum and ciprofloxacin. After 19 days he suffered a sudden onset of fever (39·5 °C), general malaise and shivering and was treated with intravenous cefuroxime. Bacterial samples from that day showed *Listeria monocytogenes* in the blood, *Enterococcus faecalis* in the urine, and a normal throat flora. The patient died the next day and autopsy was performed 5 days later. Macroscopic examination revealed generally sclerotic arteries and a cirrhotic liver. The purulent meninges were sampled by swab which was subsequently dipped in sterile thioglycolate broth and streaked onto anaerobic agar, chocolate agar, C.L.E.D. agar and blood agar with methyl violet (1·5 mg/l). This sample yielded large numbers of *L. monocytogenes*, sparse numbers of alpha haemolytic streptococcus and a few enterococcus. The two latter genera were considered to be normal contaminants in this kind of sample.

One isolate of *L. monocytogenes* from the blood culture and one isolate of *L. monocytogenes* from the meninges were serotyped and phage typed according to reference methods [1, 2]. Both isolates belonged to serovar 4b, but to different phagovars. The meningeal isolate (SLU 3176) belonged to phagovar 2389:3552:2425:1444:3274:2671:52:107:108:340 and the blood isolate (SLU 3177) belonged to phagovar 2389:2425:3274:2671:47:108:340. The antibiogram pattern was identical, i.e., both isolates were sensitive to ampicillin, meropenem, erythromycin, trimethoprim-

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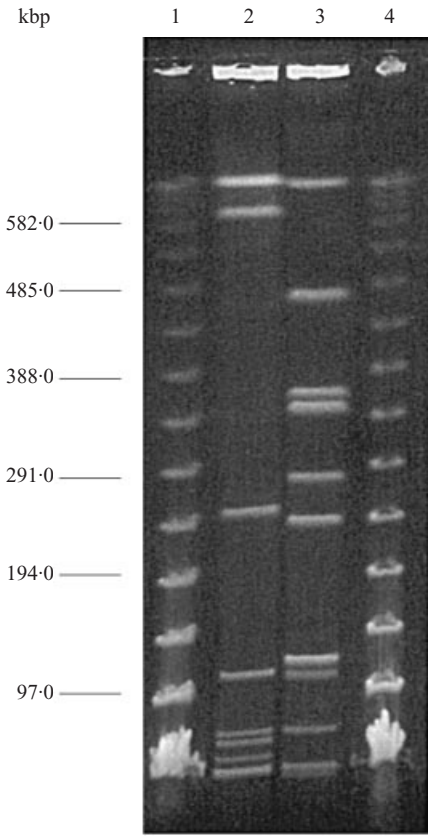

Fig. 1. REA profiles of *L. monocytogenes* produced by cleavage of DNA with *Asc*I. Lanes 1 and 4: Lambda Ladder PFG Marker NO34OS (BioLabs). Lane 2: meningeal isolate SLU 3176. Lane 3: blood isolate SLU 3177.

sulfa and rifampicin. The isolates were further characterized by use of REA/PFGE [3]. The enzyme used for restriction was *Asc*I. The meningeal isolate (SLU 3176) showed a restriction profile completely different from the blood isolate (SLU 3177) (Fig. 1). Those REA/PFGE results were repeated three times, each time with a new DNA preparation. Altogether, the two isolates were identified as *Listeria monocytogenes* by four different laboratories; Department of Clinical Microbiology in Falun (also antibiogram) and Department of Food Hygiene in Uppsala (also REA/PFGE), both in Sweden, Centre National des Listeria in Lausanne, Switzerland (also serotyping) and Institut Pasteur in Paris, France (also phage typing).

Listeriosis is a food-associated disease. Outbreaks have been due to consumption of, e.g. vegetables, soft cheese, meat products, and vacuum-packed cold-smoked and gravad fish [4]. A food item sometimes harbours more than one strain of *L. monocytogenes*. Thus, we have found five different strains in a gravad rainbow trout and four in a cheese sample [5, 6]. However, the findings of more than one strain of *L. monocytogenes* in normally sterile sites of a human listeriosis patient have not, to our knowledge, been reported before. Although, two different strains in a patient may not have any obvious clinical relevance this phenomenon constitutes an interpretation problem when investigating sources and routes of listeria infection.

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