

# *Carnobacterium inhibens* Isolated in Blood Culture of an Immunosuppressed, Metastatic Cancer Patient: A Case Report and Literature Review

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## Background

- *Carnobacterium* spp. are lactic acid-producing Gram-positive bacteria rarely isolated from humans.
- Health Canada approved for use as a bio-preservative in the food/fish industry.
- The use of bacteria as food additives pose a potential risk for immunocompromised patients including bacteria used in probiotics (e.g., *Lactobacillus* spp.), and bacteria used in bio-preservation.

## Purpose

- 1) Review published reports on human infections with *Carnobacterium* spp.
- 2) To present a case report of *Carnobacterium inhibens* isolated in blood culture of an immunosuppressed patient with pneumonia.

## Methods – Literature Search

- Inclusion criteria:
  - English-written articles
  - Human infections with *Carnobacterium* spp. isolated from any body site or culture
- Timeline: Inception to March 2020
- Databases:
  - EMBASE, OvidMEDLINE, PubMed, Google Scholar

## Discussion & Literature Review

- Non-spore-forming, lactic acid-producing, Gram-positive bacilli.
- Found in both polar and temperate environments.
- Able to tolerate and grow at a wide temperature range (-20 to +10°C).
- Can survive in high-pressure environments including vacuum-packaging process for foods.
- Approved by Health Canada as bio-preservative of ready-to-eat foods:
  - E.g., *C. divergens* and *C. maltaromaticum* for smoked fish and vacuum-packed meat/poultry, respectively.

## Case Presentation

- 81M presented with a 2-week productive cough, exertional dyspnea, general malaise and subjective fevers/chills.
- No sick contacts, travel history, exposure to (farm) animals, or handling of fish or meat products.

### Past medical history:

- Castrate-resistant prostate cancer with liver and bone metastases on enzalutamide, leuprolide and **chronic steroids**.
- Triple-bypass cardiac surgery for NSTEMI.

**Social history:** retired prison clergyman; ex-smoker; social drinker; no history of IVDU.

*N.B.:* M (male); F (female); RF (risk factors); DM (diabetes); TPN (total parenteral nutrition); Abx (antibiotics); CTX (ceftriaxone); AMP (ampicillin); MOX (moxifloxacin); AMOX (amoxicillin)

### Physical examination:

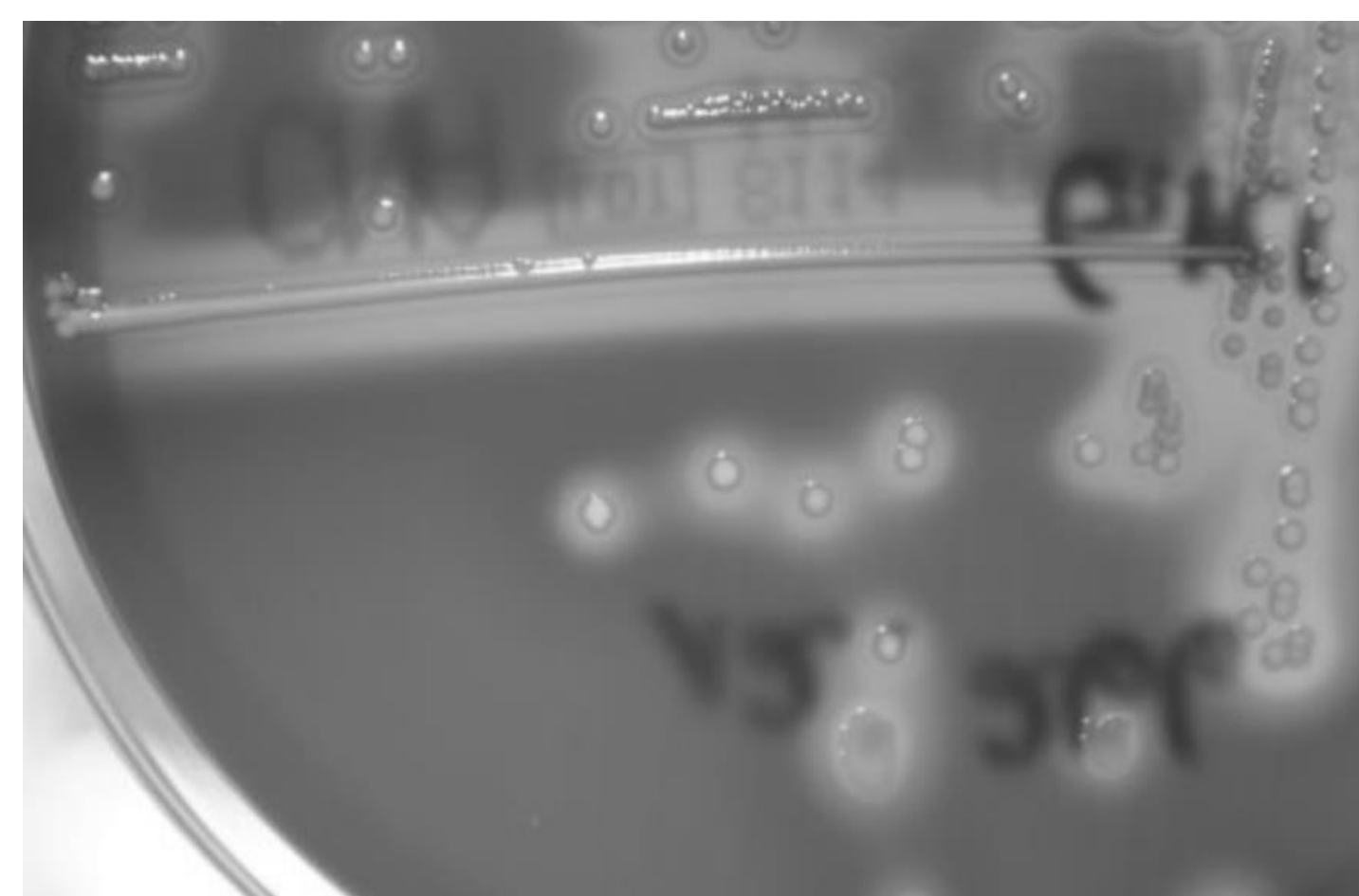
- Vitals: afebrile, sinus tachycardia, hypotensive but fluid responsive, O<sub>2</sub> sat >95% on room air.
- Lung: decreased air entry to bases; bilateral crackles.

### Investigation (septic workup):

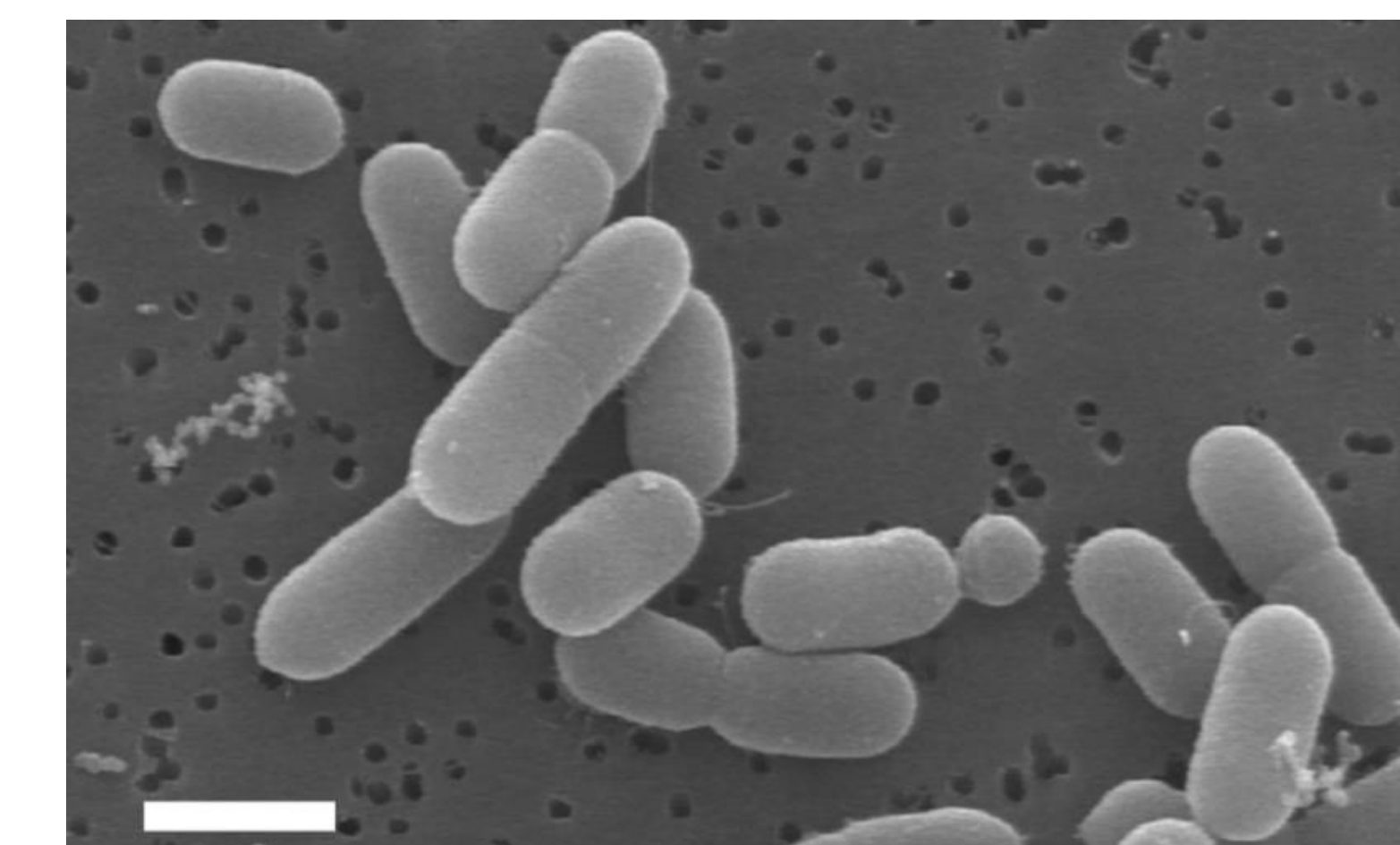
- WBC 10.7 (Neut 9.49); ESR90; CRP195.9
- **Blood culture: ½ sets positive for Gram-positive bacilli, later confirmed *C. inhibens* by PHL.**
- CT chest: multifocal pneumonia.
- TTE echo: no vegetations or valvular dysfunction.

### Management:

- Clinically improved with empiric IV ceftriaxone and vancomycin for pneumonia.
- Discharged with step-down oral amoxicillin-clavulanate for total 7 days antibiotics.



**Figure 1.** *Carnobacterium* spp. on 5% sheep blood agar; 1-2mm diameter, grey-coloured, beta-hemolytic colonies. (Source: Case 3 from literature review; Hoenigl et al.)



**Figure 2.** *Carnobacterium inhibens* on Scanning Electron Microscopy (SEM). (Source: Lawrence Berkeley National Lab; Nicholson et al.)

**Table 1.** Previously reported human infections with *Carnobacterium* spp.

Case	RF	Culture/Site	Infection	Treatment
1 - 35M	None	Mixed flora; hand abscess	Traumatic wound at water sawmill	Amputation + debridement; Abx
2 - 13F	None	Mixed flora; hand gangrene	Traumatic wound; water exposure	Amputation + debridement; Abx
3 - 43M	None	½ blood culture sets	Sepsis suspected from GI source; Extensive hx of handling and consuming fish	CTX/AMP → MOX
4 - 57F	DM; TPN; post-arrest	4 blood culture sets	Septic shock with necrotizing esophagitis requiring esophagectomy and TPN	Broad spectrum → AMOX

### References:

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3. Hoenigl et al. Isolation of *Carnobacterium* sp. from a human blood culture. J Med Microbiol. 2010;59:493-5.
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5. Smati et al. *Carnobacterium divergens* bacteremia in woman. Emerg Infect Dis. 2015;21(6):1081-2.
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