



Genome Sequence of *Listeria monocytogenes* 2542, a Serotype 4b Strain from a Cheese-Related Outbreak in Portugal

Vânia Ferreira,^a Rui Magalhães,^a Gonçalo Almeida,^{a,d} Didier Cabanes,^b Moritz Fritzenwanker,^c Trinad Chakraborty,^c Torsten Hain,^c  Paula Teixeira^a

^aCBQF—Centro de Biotecnologia e Química Fina—Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Porto, Portugal

^bGroup of Molecular Microbiology, IBMC—Institute for Molecular and Cell Biology, i3S—Institute for Research and Innovation in Health, Porto, Portugal

^cInstitute of Medical Microbiology, German Centre of Infection Research, Site Giessen-Marburg-Langen, Justus-Liebig-University Giessen, Giessen, Germany

^dINIAV, IP—National Institute for Agrarian and Veterinary Research, Vairão, Portugal

ABSTRACT We report here the draft genome sequence of *Listeria monocytogenes* 2542, a serotype 4b clinical strain recovered from a placental sample during a cheese-related listeriosis outbreak in Portugal.

Listeria monocytogenes, a Gram-positive, short, rod-shaped bacterium, is the causative agent of listeriosis, which is spread through the consumption of contaminated food (1). This pathogen has the ability to cross the intestinal, blood-brain, and fetoplacental barriers; septicemia, central nervous system infections, miscarriages, and stillbirths are the most common forms of this invasive infection (2). The establishment of the disease depends on a number of variables, including the number of ingested bacteria, the pathogenic potential of the strain, and the immunological status of the host (3). A high mortality rate is reported in groups at increased risk for listeriosis, such as pregnant women and individuals with impaired cell-mediated immunity (e.g., HIV/AIDS, cancer, immunosuppressive therapy, and organ transplant) and chronic disease (e.g., diabetes, alcoholism, and liver and renal disease), as well as individuals over 60 years old (4). Although all strains are considered virulent, *L. monocytogenes* is a highly heterogeneous species. For instance, while there are 13 different serotypes and 4 genetic lineages described for this pathogen, lineage I serotypes 4b and 1/2b are more frequently recovered in cases of human listeriosis (5).

From 2009 to 2012, a listeriosis outbreak linked to the consumption of contaminated cheese occurred in Portugal (6). A high case-fatality rate (36.7%) was reported among the 30 cases of listeriosis identified. The genome sequence of one *L. monocytogenes* strain isolated from a placental sample of a pregnant woman after stillbirth associated with this epidemic was determined by whole-genome shotgun sequencing (WGS). Chromosomal DNA of *L. monocytogenes* strain 2542 (serotype 4b) was isolated using a PureLink genomic DNA minikit (Life Technologies). For WGS, a DNA library was created as described in the Nextera XT (Illumina, Inc.) protocol. Quality control of the library was performed using the Agilent 2000 bioanalyzer (Agilent Technologies) and sequenced on the Illumina MiSeq platform using V2 chemistry. Using CLC Genomics Workbench version 6.0, 5,485,526 sequence reads were assembled, resulting in a draft genome of 2,965,111 bp.

Accession number(s). This WGS project has been deposited in DDBJ/ENA/GenBank under the accession number [FZRK00000000](https://www.ncbi.nlm.nih.gov/nuccore/FZRK00000000). The version described in this paper is the first version, FZRK01000000.

Received 15 May 2018 **Accepted** 15 May 2018 **Published** 21 June 2018

Citation Ferreira V, Magalhães R, Almeida G, Cabanes D, Fritzenwanker M, Chakraborty T, Hain T, Teixeira P. 2018. Genome sequence of *Listeria monocytogenes* 2542, a serotype 4b strain from a cheese-related outbreak in Portugal. *Genome Announc* 6:e00540-18. <https://doi.org/10.1128/genomeA.00540-18>.

Copyright © 2018 Ferreira et al. This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

Address correspondence to Torsten Hain, torsten.hain@mikrobio.med.uni-giessen.de, or Paula Teixeira, pcteixeira@porto.ucp.pt.

ACKNOWLEDGMENTS

Work done by T.C. and T.H. was supported by LOEWE Medical RNomics (B3) and the German Centre for Infection Research, Justus-Liebig University Giessen. Financial support for R.M. and V.F. was provided by Fundação para a Ciência e a Tecnologia(FCT) through Ph.D. (SFRH/BD/71704/2010) and postdoctoral (SFRH/BPD/72617/2010) fellowships, respectively. Open-access publication was cofinanced by the NEWFOOD NORTE-01-0246-FEDER-000043 project supported by the Norte Portugal Regional Operational Programme (NORTE 2020), under the Portugal 2020 Partnership Agreement through the European Regional Development Fund (ERDF). We also acknowledge the scientific collaboration under the FCT project UID/Multi/50016/2013.

REFERENCES

1. Farber J, Peterkin P. 1991. *Listeria monocytogenes*, a food-borne pathogen. *Microbiol Rev* 55:476–511.
2. Cossart P, Lebreton A. 2014. A trip in the “new microbiology” with the bacterial pathogen *Listeria monocytogenes*. *FEBS Lett* 588:2437–2445. <https://doi.org/10.1016/j.febslet.2014.05.051>.
3. Roberts AJ, Wiedmann M. 2003. Pathogen, host and environmental factors contributing to the pathogenesis of listeriosis. *Cell Mol Life Sci* 60:904–918. <https://doi.org/10.1007/s00018-003-2225-6>.
4. Swaminathan B, Gerner-Smidt P. 2007. The epidemiology of human listeriosis. *Microbes Infect* 9:1236–1243. <https://doi.org/10.1016/j.micinf.2007.05.011>.
5. Gray MJ, Zadoks RN, Fortes ED, Dogan B, Cai S, Chen Y, Scott VN, Gombas DE, Boor KJ, Wiedmann M. 2004. *Listeria monocytogenes* isolates from foods and humans form distinct but overlapping populations. *Appl Environ Microbiol* 70:5833–5841. <https://doi.org/10.1128/AEM.70.10.5833-5841.2004>.
6. Magalhães R, Almeida G, Ferreira V, Santos I, Silva J, Mendes MM, Pita J, Mariano G, Mâncio I, Sousa MM, Farber J, Pagotto F, Teixeira P. 2015. Cheese-related listeriosis outbreak, Portugal, March 2009 to February 2012. *Euro Surveill* 20:21104. <https://www.eurosurveillance.org/content/10.2807/1560-7917.ES2015.20.17.21104>.