

Encephalitozoon intestinalis, Alveolar Isolate

Catalog No. NR-9702

(Derived from ATCC® 50506™)

For research use only. Not for human use.

Contributor:

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Manufacturer:

BEI Resources

Product Description:

Fungal Classification: *Unikaryonidae*, *Encephalitozoon*

Species: *Encephalitozoon intestinalis* (formerly *Septata intestinalis*)¹

Isolate: Alveolar

Original Source: An alveolar isolate of *Encephalitozoon intestinalis* (*E. intestinalis*) was obtained in 1994 from an AIDS patient in New York, New York, USA.²

Comment: NR-9702 was derived from ATCC® 50506™, which was deposited to ATCC® by E. S. Didier.

Microsporidia are common unicellular obligate intracellular parasites which infect a wide range of invertebrate and vertebrate hosts. *E. intestinalis* is the second most common microsporidian that infects immunocompromised humans, especially AIDS patients. *E. intestinalis* was initially associated with chronic diarrhea, but was later found to spread intravascularly to the kidneys, lungs and nasal sinuses.²

Material Provided:

Each vial of NR-9702 contains approximately 0.5 mL of culture in cryopreservative. Please refer to the Certificate of Analysis for the specific culture media used for each lot and refer to Appendix I for cryopreservation instructions.

Packaging/Storage:

NR-9702 was packaged aseptically in screw-capped plastic cryovials and is provided frozen on dry ice. The product should be stored at cryogenic temperature (-130°C or colder), preferably in the vapor phase of a liquid nitrogen freezer. If liquid nitrogen storage facilities are not available, frozen cryovials may be stored at -80°C or colder for approximately one week.

Note: Do not under any circumstances store vials at temperatures warmer than -70°C. Storage under these conditions will result in the death of the culture.

To insure the highest level of viability, the culture should be initiated immediately upon receipt. Any warming of the product during shipping and transfer must be avoided, as this will adversely affect the viability of the product. For transfer

between freezers and for shipping, the product may be placed on dry ice for brief periods, although use of a portable liquid nitrogen carrier is preferred. Please read the following recommendations prior to using this material.

Growth Conditions:

Growth Media and Host Cells:

Eagle's Minimum Essential Medium (EMEM) modified to contain Earle's Balanced Salt Solution, non-essential amino acids, 2 mM L-glutamine, 1 mM sodium pyruvate and 1500 mg/L sodium bicarbonate (ATCC® 30-2003™) supplemented with 10% heat inactivated fetal bovine serum (HIFBS).

Human lung fibroblasts (WI-38; ATCC® CCL-75™)

Other cell lines that support growth of *E. intestinalis* include African green monkey kidney epithelial cells (BS-C-1; ATCC® CCL-26™) and Madin-Darby canine kidney epithelial cells (MDCK; ATCC® CCL-34™).³

Incubation:

Temperature: 35°C to 37°C

Atmosphere: Aerobic with 5% CO₂

Propagation:

- To establish a culture from the frozen state, place a vial in a 35°C to 37°C water bath. Thawing time is approximately 2 to 3 minutes. Do not agitate the vial. Do not leave the vial in the water bath after it is thawed.
- Immediately after thawing, aseptically transfer the contents into a tissue culture flask containing a fresh monolayer of human lung fibroblast cells and EMEM containing 10% (v/v) HIFBS.
- Outgas the flask for 10 seconds with a 95% air, 5% CO₂ gas mixture.
- Incubate in a 35°C to 37°C CO₂ incubator with the caps screwed on tightly. Observe the culture daily under an inverted microscope for the presence of spores growing inside parasitophorous vacuoles.

Maintenance:

- Remove the medium from a fresh confluent monolayer of human lung fibroblast cells in a tissue culture flask and replace it with 10 mL of medium containing 10% (v/v) HIFBS.
- Remove the medium from the *E. intestinalis* culture when approximately 50% of the human lung fibroblast cell monolayer has lysed. Centrifuge the spores that had been released into the medium at 1300 × g for 10 minutes.
- Remove the supernatant and resuspend the cell pellet in a small volume (0.5 mL to 1.0 mL) of EMEM containing 10% (v/v) HIFBS or phosphate buffered saline (PBS). Transfer the resuspended pellet to the fresh flask of human lung fibroblast cells, prepared in step 1 above. Follow steps 3 and 4 in Propagation.

Please refer to Appendix I for cryopreservation instructions.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: *Encephalitozoon intestinalis*, Alveolar Isolate, NR-9702."

Biosafety Level: 2

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. Biosafety in Microbiological and Biomedical Laboratories. 5th ed. Washington, DC: U.S. Government Printing Office, 2009; see www.cdc.gov/biosafety/publications/bmbl5/index.htm.

Disclaimers:

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References:

1. Hartskeerl, R. A., et al. "Genetic and Immunological Characterization of the Microsporidian *Septata intestinalis* Cali, Kotler and Orenstein, 1993: Reclassification to *Encephalitozoon intestinalis*." Parasitology 110 (1995): 277-285. PubMed: 7724235.
2. Didier, E. S., et al. "Characterization of *Encephalitozoon (Septata) intestinalis* Isolates Cultured from Nasal Mucosa and Bronchoalveolar Lavage Fluids of Two AIDS Patients." J. Eukaryot. Microbiol. 43 (1996): 34-43. PubMed: 8563708.

3. Visvesvara, G. S. "In Vitro Cultivation of Microsporidia of Clinical Importance." Clin. Microbiol. Rev. 15 (2002): 401-413. PubMed: 12097248.

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APPENDIX I: CRYOPRESERVATION

1. To harvest the *E. intestinalis* culture, detach any remaining cells (infected and uninfected) by scraping the surface of the flask with a cell scraper.
2. Transfer the cell suspension (including parasites) to 15 mL plastic centrifuge tubes. Centrifuge at 1300 × g for 10 min.
3. Remove all but 0.5 mL of the supernatant from each tube, resuspend the cell pellets, and pool them to a single tube.
4. Pass the resulting cell suspension through a syringe equipped with a 27-gauge ½-inch needle to break up any remaining cells.
5. Adjust the parasite concentration to 2×10^7 to 4×10^7 cells/mL with fresh medium [Eagle's Minimum Essential Medium (EMEM; ATCC® 30-2003™) supplemented with 10% heat inactivated fetal bovine serum or Dulbecco's PBS (ATCC® 30-2200) can be used].
Note: If the concentration of parasites is too low, centrifuge at 1300 × g for 10 min and resuspend in a smaller volume of fresh medium to yield the desired parasite concentration.
6. Mix equal volumes of parasite suspension and fresh medium or PBS containing 20% DMSO and 20% HIFBS to yield a final concentration of 1×10^7 to 2×10^7 cells/mL in 10% DMSO, 10% HIFBS. The freezing process should start 15 to 30 minutes following the addition of cryoprotective solution to the parasite suspension.
Note: To prevent culture contamination, penicillin-streptomycin solution (ATCC® 30-2300™) may be added to a final concentration of 50 U/mL to 100 U/mL penicillin and 50 µg/mL to 100 µg/mL streptomycin.
7. Dispense 0.5 mL aliquots into 1 mL to 2 mL sterile plastic screw-capped vials for cryopreservation.
8. Place the vials in a controlled rate freezing unit. From room temperature, cool the vials at -1°C/min to -40°C. If the freezing unit can compensate for the heat of fusion, maintain rate at -1°C/min through this phase. At -40°C, plunge vials into liquid nitrogen. Alternatively, place the vials in a Nalgene 1°C freezing container. Place the container at -80°C for 1.5 to 2 hours and then plunge vials into liquid nitrogen.
9. Store in either the vapor or liquid phase of a nitrogen refrigerator (-130°C or colder).