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Sentinel Flask Preparation for Cold Shipping Protocol of Human Islets

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Works for me

dx.doi.org/10.17504/protocols.io.bctziwp6



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ABSTRACT

To establish a standardized method for the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) sponsored research in the Integrated Islet Distribution Program (IIDP) for preparing a sentinel flask of human islets in order to monitor sterility and islet integrity at the production center. This is a representative sample of the islet preparation that has been distributed to investigators and is held at the distributing center as a quality control sample. The islets are cultured in the same shipping media used for islet shipment, for 18 hours at 4-8°C, simulating the cold shipping conditions followed by 2 days at 37°C culture. The flask of islets are verification in the event of a dispute over sterility or islet quality.

EXTERNAL LINK

<https://dx.doi.org/10.17504/protocols.io.bac5iay6>; <https://iidp.coh.org/Investigators/Policies-Standard-Operating-Procedures>

ATTACHMENTS

Prodo Media-Preparation-
and-Use-Instructions-1.pdf

GemCell Human Serum
AB.pdf

Attachment 1-Solutions
preparation Sheets.pdf

Attachment 2-Sentinel
Flask Documentation
Sheet.pdf

GUIDELINES

- **Integrated Islet Distribution Program (IIDP):** The IIDP is a program commissioned and funded by the NIDDK to provide quality human islets to the diabetes research community to advance scientific discoveries and translational medicine. The IIDP consists of the NIDDK Project Scientist and Program Official, the External Evaluation Committee and the CC at City of Hope (COH). The IIDP CC integrates an interactive group of academic laboratories including the subcontracted IIDP centers.
- **IIDP Coordinating Center (CC):** Joyce Niland, Ph.D., IIDP Principal Investigator leads CC staff to coordinate the activities of the IIDP and assists the participating centers and investigators in the distribution of human islets.
- **Islet Equivalent (IEQ):** An IEQ is defined as an islet with a diameter of 150 microns. The number of IEQ in each size class is calculated by multiplying the number of islets by a conversion factor for each micron size.
- **Approved Investigators:** Researchers who have requested islets from the IIDP for basic science studies and whose research protocols have been reviewed and approved by the IIDP.
- **Sentinel Flask:** A representative sample of the islet preparation that has been distributed to investigators that is held at the distributing center as a quality assurance sample. This sample should be held in the 30 mL shipping flask at the center and should contain at least 100 IEQ cultured in the same shipping media used for islet shipment. *One flask must be prepared for each purity batch of islets distributed.*

MATERIALS


NAME

CATALOG #


VENDOR


NAME	CATALOG #	VENDOR
Human AB Serum (ABS) HI	100-512; Heat Inactivated	Gemini Bioproducts
PIM(G)® (5 mL Glutamine/Glutathione)	PIM(G)®	Prodo Laboratories, Inc
PIM(T)®	PIM(T)®	Prodo Laboratories, Inc
Corning™ Ciprofloxacin Hydrochloride	MT61277RG (Corning™ 61277RG)	Fisher Scientific

MATERIALS TEXT




Invitrogen™ EVOS™ XL Core Imaging System or equivalent
 Inverted Microscope
 Light Microscope AMEX1000 [↗](#)





Corning 4492 or equivalent
 Sterile Polystyrene Serological Pipets
 Corning™ Stripette™ Wide-Tip Disposable Polystyren
 Sterile, individually wrapped, and certified nonpyrogenic and DNase-/RNase-free
 Accuracy within ±2% at full volume



07-200-619 [↗](#)



Gilson™ PIPETMAN Classic™ Pipets- F123601 or equivalent
 Adjustable pipettor -P200
 Gilson F123601G [↗](#)
 50 to 200µL, ±0.5, ±1µL





Fisherbrand™ Large-Orifice Pipet Tips, 1 to 200µL or equivalent
Genomic/Wide Orifice Pipet Tips
Fisherbrand 02-707-134 [↗](#)
1 to 200µL



Drummond™ Fixed-Volume Microdispensers or equivalent
Drummond 3000385
Drummond™ 21176F [↗](#)
Volumetric Range 100/200UL with borosilicate glass bores



Bottle Top Filters with PES Membrane or equivalent
0.2 µm Bottle Top Filter
Thermo Scientific™ Nalgene™ Rapid-Flow™ Sterile Di
0.2 µm membranes for sterile filtration; PES is the best membrane for cell culture fluids; lowest protein binding to maintain protein balance, lowest extractables to maintain media purity

09-741-09 [↗](#)





Thermo Scientific™ Nalgene™ Square PETG Media Bottles with Closure
30 mL PETG Media Bottles with Closure
Thermo Scientific™ Nalgene™ 03-311-1V [↗](#)
30 mL PETG Media Bottles



EQUIPMENT

NAME	CATALOG #	VENDOR
Invitrogen™ EVOS™ XL Core Imaging System or equivalent	AMEX1000	
Corning 4492 or equivalent	07-200-619	Fisher Scientific
Gilson™ PIPETMAN Classic™ Pipets- F123601 or equivalent	F123601G	
Fisherbrand™ Large-Orifice Pipet Tips, 1 to 200µL or equivalent	02-707-134	
Drummond™ Fixed-Volume Microdispensers or equivalent	21176F	
Bottle Top Filters with PES Membrane or equivalent	09-741-09	Thermo Fisher Scientific
Thermo Scientific™ Nalgene™ Square PETG Media Bottles with Closure	03-311-1V	Fisher Scientific

SAFETY WARNINGS

Please see attached SDS (Safety Data Sheet) for hazards and safety warnings.

Ciprofloxacin Hydrochloride

Precautionary statements:

- P280 - Wear protective gloves and eye/face protection
- P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337 + P313 - If eye irritation persists: Get medical advice/attention.
- P273 - Avoid release to the environment.

GemCell™ U.S. Origin Human Serum AB

GemCell™ human serum AB is collected from healthy male donors of the AB serotype at FDA-licensed facilities in the United States.

Hazardous Components:

- Biohazard contains human source material. Handle as though capable of transmitting infectious agents.
- Toxicity: Not Established.

Target Organs/Systems: Product could possibly irritate the skin, eyes and respiratory system. Do not ingest this product.

BEFORE STARTING

Prodo Labs, Inc. Protocols and Website: <http://www.prodolabs.com>



Ricordi, C. (1992). Pancreatic Islet Cell Transplantation..
Austin: R.G. Landes Company, 1992:137-138..



Ricordi, C. (Ed). (1995). Methods in Cell Transplantation..
Austin: R.G. Landes Company, 1995: Section G..

SUPPLEMENTAL MATERIALS

- 1 The following supplies are necessary for the preparation of Sentinel Test Flasks for human islet distribution.
 - Islet preparation for distribution
 - Wide mouth pipettes and pipettor
 - 30 mL shipping bottles - 1 per islet purity batch broadcasted.
 - Shipping media that is to be used for distribution as described below.

MEDIA PREPARATION

- 2 Shipping media that is to be used for distribution is prepared as described below.
 - The Prodo Labs PIM(T) should be stored between 2° and 8°C upon receipt but is stable at room temperature.
 - The (heat inactivated) Gemini AB serum and the PIM(G) vials should be stored at -5° to -20°C.
- 3 The Ciprofloxacin powder can be stored on the shelf but filter sterilized suspension aliquots should be stored at -5° to -20°C.

Pre-Preparation of Ciprofloxacin Powder for Addition to Media

- Remove 0.5 gm (500mg) of ciprofloxacin hydrochloride from the bottle and QS to 50mL with distilled water. This will give a stock concentration of 10mg/mL.
- Mix with a stir bar and stirring plate until totally dissolved.
- Filter sterilize the solution using a 0.2µM filter.
- Aliquot into sterile tubes, 5mL samples, label, and freeze for later use.
- The expiration date of the solution is indicated on the Certificate of Analysis and/or the bottle. Document expiration date as date of CoA.
- Diluted solution is good for 1 year frozen (if less than CoA expiration date) and 1 month thawed.

- 4 Prepare 1 bottle of PIM(T) media prior to the collection by adding the following:
 - Thaw and add 5 mL of PIM(G).
 - Add 12.5 mL of AB serum (2.5%v/v).
 - Add 0.5 mL of prepared sterile ciprofloxacin aliquot.
 - Once all additives have been added to the bottle of PIM(T), it is now referred to as PIM(T) complete.



Note: If a prepared media bottle is to be used from a previous isolation, it must have been filter sterilized at the end of the previous use. The media will expire within 30 days, once it has been fully supplemented.

SENTINEL FLASK PREPARATION

- 5 Assemble all items described in the *Material and Media Preparation Sections*.
- 6 At the time of preparation for islet distribution, the cultured islets are consolidated and counted. Calculate the volume of suspension that is needed from the islet preparation to provide at least 100 IEQs.

The formula will be:

$$\text{TotalIEQ} / (\text{TotalmL} * 1000\mu\text{L}) = x\text{IEQ} / \mu\text{L} \text{ then}$$

$$100\text{IEQ} / x\text{IEQ} / \mu\text{L} = y\mu\text{L}$$

- 7 Thoroughly resuspend the preparation with a large mouth pipet and remove the calculated aliquot. Place in the 30mL shipping flask. Top with appropriate amount of media using the same batch of PIM(T) complete that will be used for distribution. *Repeat for each purity batch that is being distributed.*
- 8 Store this/these Sentinel QA Flask(s) between 4°C and 8°C for approximately 18 hours after which the flask(s) should be moved to a 37°C incubator for an additional 2 days.



Note: This culture procedure should simulate the average shipping time followed by culture by an investigator. A lab refrigerator should be appropriate for the first 18 hours of cold temperature culture.

- 9 Observe under a microscope daily for visual islet integrity, quality, and sterility. Record results on *Attachment 2 - Sentinel Flask Documentation Sheet*.
- 10 Alert the IIDP and the recipients of the distributed islets if there is a problem with the sterility of the preparation. In which case, send a copy of the *Attachment 1-Sentinel Flask Documentation Sheet* to IIDP.



The sentinel flask is mainly for the documentation of the preparation by the distribution center in circumstances where islet sterility, quality or integrity of the distributed islets is questioned by a recipient. Photographs may be required to document the visual state of the sentinel flask if there is a challenge.