Product Information and Testing

Product Information - Amended

Product Name	iPS(IMR90)-4
Alias	iPS(IMR90) clone (#4)
Lot Number	WB0088
Parent Material	iPS(IMR90)-4-MCB-01
Depositor	University of Wisconsin – Laboratory of Dr. James Thomson
Banked by	WiCell
Thaw Recommendation	Thaw 1 vial into 4 wells of a 6 well plate.
Culture Platform	Feeder Independent
	Medium: mTeSR1
	Matrix: Matrigel
Protocol	WiCell Feeder Independent Protocol
Passage Number	p18+32 These cells were cultured for 49 passages prior to freeze. Fibroblasts were cultured 18 passages prior to reprogramming, and 31 passages post transformation, at least 6 of them in mTeSR1/Matrigel prior to freeze. WiCell adds +1 to the passage number at freeze so that the number on the vial best represents the overall passage number of the cells at thaw.
Date Vialed	07-April-2011
Vial Label	WB0088 iPS(IMR90)-4 p18+32 MW 07APR2011
Biosafety and Use Information	Appropriate biosafety precautions should be followed when working with these cells. The end user is responsible for ensuring that the cells are handled and stored in an appropriate manner. WiCell is not responsible for damages or injuries that may result from the use of these cells. Cells distributed by WiCell are intended for research purposes only and are not intended for use in humans.

Testing Performed by WiCell

Test Description	Test Provider	Test Method	Test Specification	Result
Post-Thaw Viable Cell Recovery	WiCell	SOP-CH-305	≥ 15 Undifferentiated Colonies, ≤ 30% Differentiation and recoverable attachment after passage	Pass
Identity by STR	UW Molecular Diagnostics Laboratory	PowerPlex 16 HS System by Promega	Consistent with known profile	Pass
Sterility	Apptec	30744	Negative	Pass
Mycoplasma	Bionique	M250	Negative	Pass
Karyotype by G-banding	WiCell	SOP-CH-003	Normal Karyotype	Pass
Comprehensive Human Virus Panel	Charles River	ID 91/0	Negative	Pass

Date of Lot Release	Quality Assurance Approval
14-September-2011	10/11/2016 X AMK AMK Quality Assurance Signed by: Klade, Anjelica

UW Health
University of Wisconsin Hospital and Clinics

Histocompatibility/Molecular Diagnostics Laboratory
[redacted]

Short Tandem Repeat Analysis*

Sample Report: 10139-STR | UW HLA#: 65550 | Sample Date: 07/01/11, Received Date: 07/01/11

Requestor: WiCell Research Institute
Test Date: 07/05/11 | File Name: 110706 | Report Date: 07/12/11

Sample Name: (label on tube) **10139-STR**

Description: WiCell Research Institute provided genomic DNA
269.4 ug/mL; 260/280 = 1.92

Locus	Repeat #	STR Genotype
D16S539	5, 8-15	Identifying information has been redacted to protect donor confidentiality. If more information is required, please, contact WiCell's Technical Support.
D7S820	6-14	
D13S317	7-15	
D5S818	7-15	
CSF1PO	6-15	
TPOX	6-13	
Amelogenin	NA	
TH01	5-11	
vWA	11, 13-21	

Comments: Based on the 10139-STR DNA dated and received on 07/01/11 from WiCell Research Institute, this sample (UW HLA# 65550) exactly matches the STR profile of the human stem cell line iPS(IMR90) comprising 16 allelic polymorphisms across the 8 STR loci analyzed. No STR polymorphisms other than those corresponding to the human iPS(IMR90) stem cell line were detected and the concentration of DNA required to achieve an acceptable STR genotype (signal/ noise) was equivalent to that required for the standard procedure (~1 ng/amplification reaction) from human genomic DNA. These results suggest that the 10139-STR DNA sample submitted corresponds to the iPS(IMR90) stem cell line and it was not contaminated with any other human stem cells or a significant amount of mouse feeder layer cells. Sensitivity limits for detection of STR polymorphisms unique to either this or other human stem cell lines is ~5%.

[redacted] 7/13/11
Date
Molecular Diagnostics Laboratory

[redacted] 07/12/11
William M. Rehrauer, PhD, Director Date
Molecular Diagnostics Laboratory

* Testing to assess engraftment following bone marrow transplantation was accomplished by analysis of human genetic polymorphisms at STR loci. This methodology has not yet been approved by the FDA and is for investigational use only.

File: Final STR Report

Test Facility:
[redacted]

WuXi AppTec

Report Number
869398
Page 1 of 1

WiCell Research Institute
[redacted]

June 24, 2011
P.O. #: [redacted]

STERILITY TEST REPORT

Sample Information: hES Cells
1: IMR90-4-WB0088 10133
2: WA09-WB0090 10134
3: WA01-CB-01 10135
4: SOP-CC-006D.33 10136

Date Received: June 07, 2011
Date in Test: June 09, 2011
Date Completed: June 23, 2011

Test Information: Test Codes: 30744, 30744A
Immersion, USP / 21 CFR 610.12
Procedure #: BS210WCR.201

TEST PARAMETERS	PRODUCT	
Approximate Volume Tested	0.5 mL	0.5 mL
Number Tested	8	8
Type of Media	SCD	FTM
Media Volume	400 mL	400 mL
Incubation Period	14 Days	14 Days
Incubation Temperature	20 °C to 25 °C	30 °C to 35 °C
RESULTS	8 NEGATIVE	8 NEGATIVE

[redacted] 06-24-11
QA Reviewer **Date**

[redacted] 06-24-11
Technical Reviewer **Date**

Testing conducted in accordance with current Good Manufacturing Practices.

[redacted]

bionique Testing Laboratories

MYCOPLASMA TESTING SERVICES

BIONIQUE® TESTING LABORATORIES, INC.

[redacted]

APPENDIX

Document ID #:	DCF9002F
Title:	QUALITY ASSURANCE REPORT - GMP
Effective Date:	03/12/10
Edition #:	01

QUALITY ASSURANCE REPORT – GMP

TEST PERFORMED	PROCEDURAL REFERENCE	TEST PERFORMED	PROCEDURAL REFERENCE
☒ M-250	SOP's 3008, 3011, 3013	☐ M-700	SOP's 3008, 3009, 3010
☐ M-300	SOP's 3008, 3014	☐ M-800	SOP's 3008, 3011, 3016
☐ M-350	SOP's 3008, 3014, 3015		

Bionique Sample ID #(s) 65735

This testing procedure was performed in compliance with the FDA's Current Good Manufacturing Practice (cGMP) standards (to the extent that the regulations pertain to the procedures performed) as specified in the Code of Federal Regulations, Title 21 Parts 210 and 211 [21 CFR 210 & 211]. All related records derived from the test procedures have been reviewed by the Quality Assurance Department. The individual's signature below verifies that the methods and procedures referenced above have been followed and that the Final Report accurately reflects the raw data generated during the course of the procedures. All records, including raw data and final reports are archived on site for a minimum of seven years.

The specified test's procedures determine the intervals at which samples are inspected. The medium used for testing must pass quality control mycoplasmal growth promotion testing and sterility testing. Traceability of all of the components used is assured and supporting documentation can be supplied upon request.

Quality Assurance Review Date: 7/13/11

Reviewed By [redacted] QA Assistant: [redacted]

NOTE:

1. Prior to receipt at Bionique® Testing Laboratories, Inc., the stability of the test article is the responsibility of the company submitting the sample. Bionique Testing Laboratories Inc. will assume responsibility for sample stability following receipt and prior to being placed on test.
2. This test is for the detection of microbiological growth and does not require statistical validation.

REFERENCES

Regulatory:

1. Department of Health and Human Services, Food and Drug Administration (USA) [FDA]. Code of Federal Regulations [CFR], Title 21 CFR Part 210, Current Good Manufacturing Practice in Manufacturing, Processing, Packing, or Holding of Drugs; General. FDA. Office of the Federal Register, National Archives and Records Department.
2. Department of Health and Human Services, Food and Drug Administration (USA) [FDA]. Code of Federal Regulations [CFR], Title 21 CFR Part 211, Current Good Manufacturing Practice for Finished Pharmaceuticals. FDA. Office of the Federal Register, National Archives and Records Department.
3. Department of Health and Human Services, Food and Drug Administration (USA) [FDA]. Points to Consider in the Characterization of Cell Lines Used to Produce Biologicals, Director, Center for Biologics Evaluation and Research, FDA. May, 1993. Docket No. 84N-0154.
4. Department of Health and Human Services, Food and Drug Administration (USA) [FDA]. Code of Federal Regulations [CFR], Title 21 CFR Part 610.30, General Biological Products Standards; Subpart D, Test for Mycoplasma. FDA. Office of the Federal Register, National Archives and Records Department.

General:

1. Barile MF, Kern J. Isolation of Mycoplasma arginini from commercial bovine sera and its implication in contaminated cell cultures. Proceedings of the Society for Experimental Biology and Medicine, Volume 138, Number 2, November 1971.
2. Chen, T.R. In situ detection of mycoplasma contamination in cell cultures by fluorescent Hoechst 33258 stain. Experimental Cell Research, 104: 255-262, 1977.
3. Carolyn K. Lincoln and Daniel J. Lundin. Mycoplasma Detection and Control. U. S. Fed. for Culture Collections Newsletter, Vol. 20, Number 4, 1990.
4. Fetal Bovine Serum; Proposed Guideline. National Committee For Clinical Laboratory Standards (NCCLS), Vol. 10, Number 6, 1990. (NCCLS publication M25-P).
5. McGarrity GJ, Sarama J, Vanaman V. Cell Culture Techniques. ASM News, Vol. 51, No. 4, 1985.
6. Tully JG, Razin S. Methods in Mycoplasmology, Volumes I and II. Academic Press, N.Y., 1983.
7. Barile MF, Razin S, Tully JG, Whitcomb RF. The Mycoplasmas, Volumes 1-4. Academic Press, N.Y., 1979.
8. http://www.bionique.com/ - Safe Cells Insights

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MYCOPLASMA TESTING SERVICES

BIONIQUE TESTING LABORATORIES, INC.
[redacted]

Document#: DCF3013D
Edition#: 10
Effective Date: 07/15/2003
Title: **M-250 FINAL REPORT SHEET**

M-250 FINAL REPORT

Direct Specimen Culture
Procedure 3008, 3011, 3013

TO: **WiCell QA**
WiCell Research Institute
[redacted]

BTL SAMPLE ID#: **65735** P.O.#: [redacted] DATE REC'D: **06/14/2011**

TEST/CONTROL ARTICLE:

iPS(IMR90)-4-WB0088 10139

LOT#: **NA**

DIRECT CULTURE SET-UP (DAY 0) DATE: **06/15/2011**

INDICATOR CELL LINE (VERO) SEE DNA FLUOROCHROME RECORD SHEET

			DATE
THIOGLYCOLLATE BROTH	DAY 7	+ ⊖	06/22/2011
	DAY 28	+ ⊖	07/13/2011
BROTH-FORTIFIED COMMERCIAL			
0.5 mL SAMPLE	DAY 7	+ ⊖	06/22/2011
6.0 mL BROTH	DAY 28	+ ⊖	07/13/2011
BROTH-MODIFIED HAYFLICK			
0.5 mL SAMPLE	DAY 7	+ ⊖	06/22/2011
6.0 mL BROTH	DAY 28	+ ⊖	07/13/2011
BROTH-HEART INFUSION			
0.5 mL SAMPLE	DAY 7	+ ⊖	06/22/2011
6.0 mL BROTH	DAY 28	+ ⊖	07/13/2011

(See Reverse)

Document#: DCF3013D
Edition#: 10
Effective Date: 07/15/2003
Title: M-250 FINAL REPORT SHEET

SAMPLE ID#: **65735**		AEROBIC	MICROAEROPHILIC	DATE
AGAR PLATES-FORTIFIED COMMERCIAL	DAY 7	+ ⊖	+ ⊖	06/22/2011
	DAY 14	+ ⊖	+ ⊖	06/29/2011
	DAY 21	+ ⊖	+ ⊖	07/06/2011
AGAR PLATES-MODIFIED HAYFLICK	DAY 7	+ ⊖	+ ⊖	06/22/2011
	DAY 14	+ ⊖	+ ⊖	06/29/2011
	DAY 21	+ ⊖	+ ⊖	07/06/2011
AGAR PLATES-HEART INFUSION	DAY 7	+ ⊖	+ ⊖	06/22/2011
	DAY 14	+ ⊖	+ ⊖	06/29/2011
	DAY 21	+ ⊖	+ ⊖	07/06/2011
BROTH SUBCULTURES (DAY 7)		DATE: 06/22/2011		
AGAR PLATES-FORTIFIED COMMERCIAL	DAY 7	+ ⊖	+ ⊖	06/29/2011
	DAY 14	+ ⊖	+ ⊖	07/06/2011
	DAY 21	+ ⊖	+ ⊖	07/13/2011
AGAR PLATES-MODIFIED HAYFLICK	DAY 7	+ ⊖	+ ⊖	06/29/2011
	DAY 14	+ ⊖	+ ⊖	07/06/2011
	DAY 21	+ ⊖	+ ⊖	07/13/2011
AGAR PLATES-HEART INFUSION	DAY 7	+ ⊖	+ ⊖	06/29/2011
	DAY 14	+ ⊖	+ ⊖	07/06/2011
	DAY 21	+ ⊖	+ ⊖	07/13/2011

RESULTS: No detectable mycoplasmal contamination

7/13/11
Date

[redacted]
Laboratory Director
[redacted] Ph.D.

M-250 Procedural Summary: The objective of this test is to ascertain whether or not detectable mycoplasmas are present in an in vitro cell culture sample, be it a primary culture, hybridoma, master seed stock or cell line. This procedure combines an indirect DNA staining approach to detect non-cultivable mycoplasmas with a direct culture methodology utilizing three different mycoplasmal media formulations. The indirect approach involves the inoculation of the sample into a mycoplasma-free VERO (ATCC) indicator cell line and performing a DNA fluorochrome assay after 72-120 hours of incubation. The direct culture aspect of the test utilizes three different mycoplasmal media including both broth and agar formulations. The sample is inoculated into each of the 3 broth formulations and also onto duplicate plates (0.1 mL/plate) for each of the 3 agar formulations. Subculture from broth to fresh agar plates is carried out after 7 days incubation. Agar plates are incubated aerobically and microaerophillically in order to detect any colony forming units morphologically indicative of mycoplasmal contamination. Issuance of the final report with signature of the Laboratory Director signifies that the required controls were performed concurrently with the test sample(s) as detailed in the referenced SOPs and that all test conditions have been found to meet the required acceptance criteria for a valid test, including the appropriate results for the positive and negative controls.

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MYCOPLASMA TESTING SERVICES

BIONIQUE® TESTING LABORATORIES, INC.

[redacted]

Document ID #:	DCF3008A
Title:	**DNA FLUOROCHROME ASSAY RESULTS**
Effective Date:	3/24/10
Edition #:	07

DNA-FLUOROCHROME ASSAY RESULTS

Procedures 3008, 3009, 3011

Sample ID # **65735** **M-250** Date Rec'd: **06/14/2011** P.O. # [redacted]

Indicator Cells Inoculated: Date/Initials: 6/16/11 / mlk

Fixation: Date/Initials: 6/20/11 / mlk

Staining: Date/Initials: 6/20/11 / mlk

TEST/CONTROL ARTICLE:

iPS(IMR90)-4-WB0088 10139

LOT# **NA**

WiCell QA
WiCell Research Institute

[redacted]

Phone: [redacted]

Fax #:

DNA FLUOROCHROME ASSAY RESULTS:

X **NEGATIVE:** A reaction with staining limited to the nuclear region, which indicates no mycoplasmal contamination.

_____ **POSITIVE:** A significant amount of extranuclear staining which strongly suggests mycoplasmal contamination.

_____ **INCONCLUSIVE:**

_____ A significant amount of extranuclear staining consistent with low - level mycoplasmal contamination or nuclear degeneration.

_____ A significant amount of extranuclear staining consistent with bacterial, fungal or other microbial contaminant or viral CPE. Morphology not consistent for mycoplasmal contamination.

COMMENTS:

Date: 6/20/11 Results Read by: mlk Date of Review: 6/20/11 Reviewed by: SM

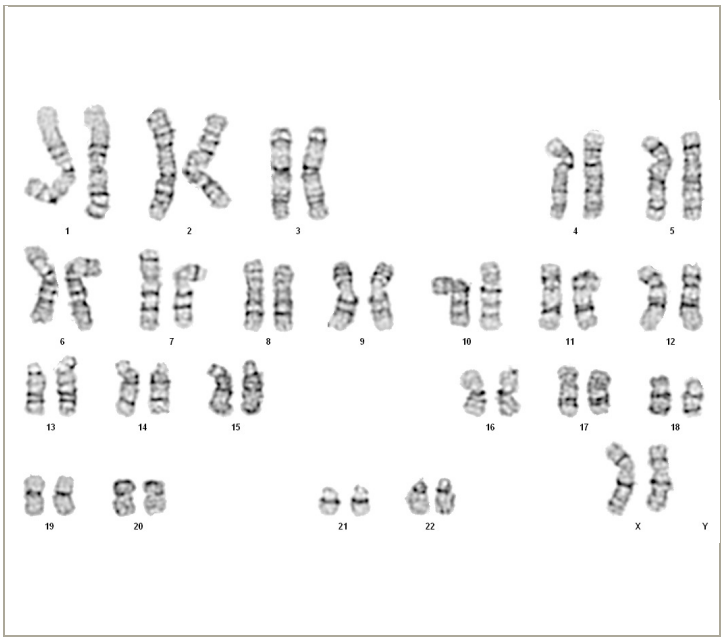
WiCell Cytogenetics Report: 006033

Report Date: June 22, 2011

Cell Line: (IMR90)-4-WB0088 10139
Passage #: 18+35
Date of Sample: 6/16/2011
Date Completed: 6/22/2011

Specimen: iPSC on Matrigel
Cell Line Gender: Female
Reason for Testing: Release testing
Investigator: [redacted]

Results: 46,XX



Cell: S01-23
Slide: 1-R1(7)KARYOTYPE
Slide Type: Karyotyping

# of Cells Counted: 20
# of Cells Karyotyped: 4
# of Cells Analyzed: 8
Band Level: 450-475

Interpretation:
No clonal abnormalities were detected within the limits of resolution of this assay.

Completed by [redacted] **CG(ASCP), on 6/22/2011**
Reviewed and interpreted by [redacted]**, PhD, FACMG, on 6/22/2011**

Results Transmitted by Fax / Email / Post **Date:**_____
Sent By:_____ **Sent To:**_____
QC Review By: _____ **Results Recorded:** _____

Charles River Research Animal Diagnostic Services

[redacted]

Sponsor: WiCell Research Institute **Accession #: 2011-036709**

Diagnostic Summary Report

[redacted]

Received: 03 Aug 2011
[redacted] 08 Aug 2011, 12:47

Bill Method: PO#[redacted]
Test Specimen: Human

Sample Set	Service (# Tested)	Profile	Assay	Tested	+	+/-	?
#1	Infectious Disease PCR (1)	All Results Negative					

+ = Positive, +/- = Equivocal, ? = Indeterminate

Service Approvals

Service	Approved By*	Date
Infectious Disease PCR	[redacted]	08 Aug 2011, 12:47

To assure the SPF status of your research animal colonies, it is essential that you understand the sources, pathobiology, diagnosis and control of pathogens and other adventitious infectious agents that may cause research interference. We have summarized this important information in infectious agent **Technical Sheets**, which you can view by visiting http://www.criver.com/info/disease_sheets.

**This report has been electronically signed by laboratory personnel. The name of the individual who approved these results appears in the header of this service report. All services are performed in accordance with and subject to General Terms and Conditions of Sale found in the Charles River Laboratories-Research Models and Services catalogue and on the back of invoices.*

Charles River Research Animal Diagnostic Services
[redacted]

Sponsor: WiCell Research Institute **Accession #: 2011-036709**

Product: Not Indicated **Test Specimen:** Human **Received:** 03 Aug 2011

Molecular Diagnostics Infectious Disease PCR Results Report

Department Review: Approved by [redacted] 08 Aug 2011, 12:47*

Human Comprehensive Virus Panel

Sample #: / **Code :**	**1** iPS(IMR90)-4 10184
John Cunningham virus	**-**
BK virus	**-**
Herpesvirus type 6	**-**
Herpesvirus type 7	**-**
Herpesvirus type 8	**-**
Parvovirus B19	**-**
Epstein-Barr Virus	**-**
Hepatitis A virus	**-**
Hepatitis B virus	**-**
Hepatitis C virus	**-**
HPV-16	**-**
HPV-18	**-**
Human T-lymphotropic virus	**-**
Human cytomegalovirus	**-**
HIV-1	**-**
HIV-2	**-**
Adeno-associated virus	**-**
Human Foamy Virus	**-**
LCMV PCR	**-**
Hantavirus Hantaan PCR	**-**
Hantavirus Seoul PCR	**-**
Mycoplasma Genus PCR	**-**
DNA Spike	**PASS**
RNA Spike	**PASS**
NRC	**PASS**

Remarks: - = Negative; I = Inhibition, +/- = Equivocal; + = Positive.

Sample Suitability/Detection of PCR Inhibition:
Sample DNA or RNA is spiked with a low-copy number of a exogenous DNA or RNA template respectively. A spike template-specific PCR assay is used to test for the spike template for the purpose of determining the presence of PCR inhibitors. The RNA spike control is also used to evaluate the reverse-transcription of RNA. Amplification of spike template indicates that there is no detectable inhibition and the assay is valid.

NRC:
The nucleic acid recovery control (NRC) is used to evaluate the recovery of DNA/RNA from the nucleic acid isolation process. The test article is spiked with a low-copy number of DNA/RNA template prior to nucleic acid isolation. A template-specific PCR assay is used to detect the DNA/RNA spike.

**This report has been electronically signed by laboratory personnel. The name of the individual who approved these results appears in the header of this service report.*