

# Clonetics™ Cells in Pancreatic Cancer Research

1 April 2014 / Speaker: Andrew Winner

2 April 2014 / Speaker: Dr. Nazim El-Andaloussi

# Outline

- Introduction to Pancreatic Cancer
- Differences Between Primary Cells and Cell Lines
- Research Breakthroughs and Challenges
- Benefits of Clonetics™ Pancreatic Islets
- Custom Products for Pancreatic Research

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# Pancreatic Cancer Research Market

- Fourth leading cause of cancer deaths<sup>1</sup>
- Median survival time < 6 months<sup>1</sup>
- Challenging early stage detection
- NCI supports development of new treatments<sup>2</sup>

1. Howard, 1966; Parker, 1996; Greenlee et al., 2000

2. Elekta

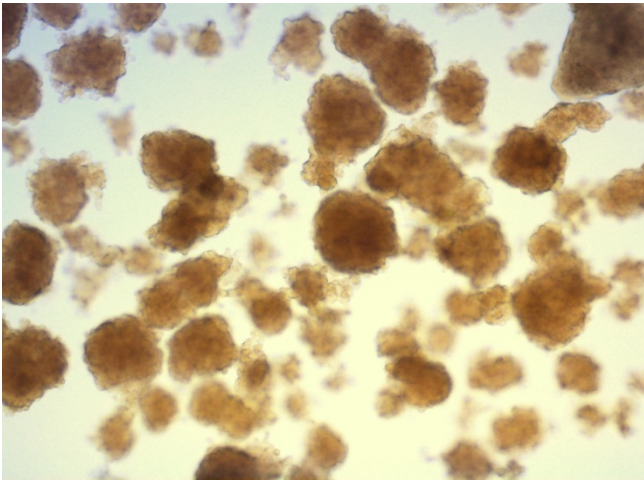
# Pancreatic Cancer Types

- Neuroendocrine tumors (NET)
  - Endocrine cancer – Tumorous islets
  
- Ductal adenocarcinoma
  - Exocrine Cancer
  
- Acinar cell carcinoma
  - Rare malignant tumor; poor prognosis

# Primary Cell Types

## Endocrine Region

- Pancreatic islets – Alpha, beta cells, delta, PP, Epsilon
- 1 to 2% of pancreas



## Exocrine Region

- Acinar, ductal, centroacinar, stem cells
- Acinar cells – 85% of pancreas
- Ductal cells – 10% of pancreas

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# [Normal] Primary Cells vs. Pancreatic Cell Lines

## Primary Cells

## Cell Lines

Islet Substitutions



Mutation Rate



Tissue Representation



Characterization Need



Costs – Sample Number





# Concerns About Cell Lines

- NIH - authentication of cultured cell lines **critical** for grant<sup>1</sup>
- Some journals mandate characterization before publication
- 18-36% cell lines misidentified or cross-contaminated<sup>2</sup>
- “Discrepancies exist...for...phenotype and genotype of pancreatic cell lines to warrant careful scrutiny...and thorough application of appropriate controls...”<sup>3</sup>

1. Notice Number: NOT-OD-08-017 <[grants.nih.gov/grants/guide/notice-files/NOT-OD-08-017.html](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-017.html)>
2. Hughes P *et al.* (2007)
3. Pancreas. 2010 May; 39(4): 425–435

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# Recent Research Breakthroughs

- First Human Model of Cancer Progression – PSC's from Pancreatic Cancer Cells<sup>1</sup>
- Discovery of cancer stem cells in pancreatic tumors helps understand pancreatic cancer development

1. *ScienceDaily* June 20, 2013 <<http://www.sciencedaily.com/releases/2013/06/130620132105.htm>>

# Current Research Challenges

- Inconsistent literature on characterization profile of pancreatic cell lines<sup>1</sup> ✓
- Limited cell line options for human islets<sup>2</sup> ✓
- Limited access to normal primary human islets for research use ✓
- Limited access to early-stage donor-cells<sup>3</sup>
- Isolation difficulties of primary cell types from pancreas<sup>4</sup>

1. Pancreas. 2010 May; 39(4): 425–435

2. Gordon C. Weir. *Clin Invest.* 2011;121(9):3395–3397

3. Sharon Reynolds. Stem Cells Reveal Secrets About Cancer. <http://www.livescience.com/42402-stem-cells-cancer-research-nigms.html>

4. M.J Smelt et. al. Experimental Diabetes Research Volume 2008 (2008), Article ID 165360, 11 pages

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# Why Use Clonetics™ Human Pancreatic Islets?

- Human islet center that manufactures for clinical transplantation
- Fresh and frozen – Non-tumorous islets + acinar tissue
- Identity, quantity, purity, & viability testing
- Easy acquisition & steady supply

# Why Use Clonetics™ Human Pancreatic Islets?

- Special donor characteristics
- Wilson Wolf Flask
- Growth Media included
- Technical Support

# Clonetics™ High-Quality Islets Preparations

Table: Characteristics of islet preparations and outcome of dynamic insulin function assay

		NHP (n=2)	Human (n=3)	AP (n=3)	JP (n=4)
Characteristics of Islet Preparations	Purity (% dithizone stain)	83 ± 11	85 ± 13	90 ± 00	63 ± 19
	OCR/DNA (nmol/min.mg DNA)	221 ± 57 <sup>h</sup>	121 ± 12 <sup>n<sup>h</sup>p,ap,jp</sup>	265 ± 25 <sup>h,jp</sup>	188 ± 3.2 <sup>a,h,ap</sup>
	Total insulin (pg/ng DNA)	5.9 ± 0.9 <sup>jp</sup>	7.8 ± 3.9 <sup>jp</sup>	9.2 ± 3.4 <sup>jp</sup>	1.5 ± 0.8 <sup>n<sup>h</sup>p,h,ap</sup>
Insulin Secretory Function (AUC, pg insulin/ng DNA)	Glucose 1 <sup>st</sup> + 2 <sup>nd</sup> phase (16.7 mM)	335 ± 7 <sup>ap,jp</sup>	348 ± 85 <sup>ap,jp</sup>	121 ± 78 <sup>n<sup>h</sup>p,h,jp</sup>	11.4 ± 4.6 <sup>n<sup>h</sup>p,h,ap</sup>

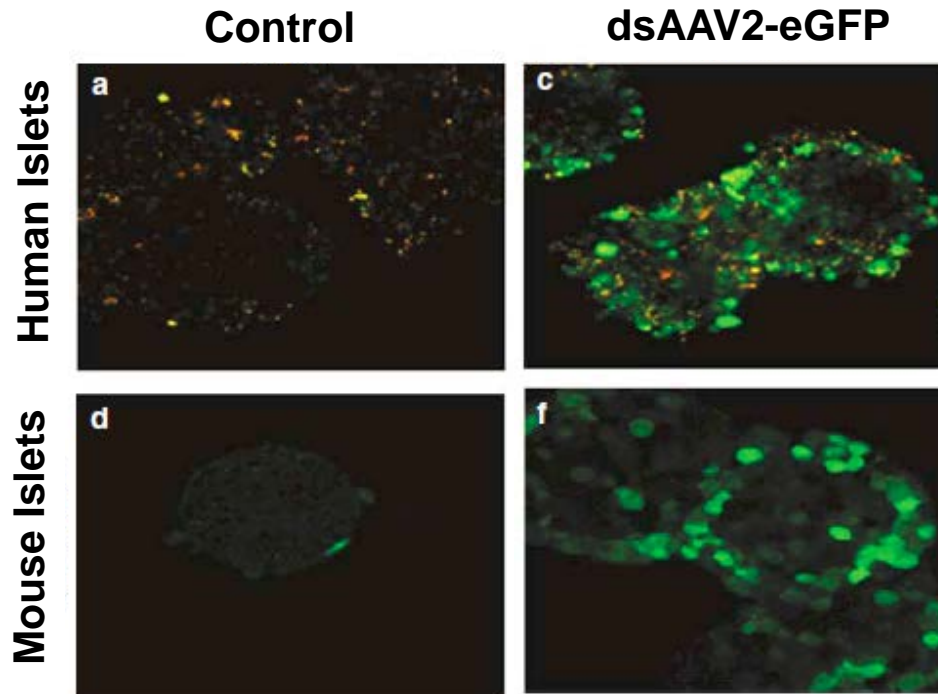
<sup>a</sup> OCR/DNA data were available for 3 of 4 cases in the JP group.

Data are presented as arithmetic mean values ± SD.

Statistical significance (P < 0.05): <sup>n<sup>h</sup>p</sup> compared with NHP; <sup>h</sup> compared with human; <sup>ap</sup> compared with AP; <sup>jp</sup> compared with JP

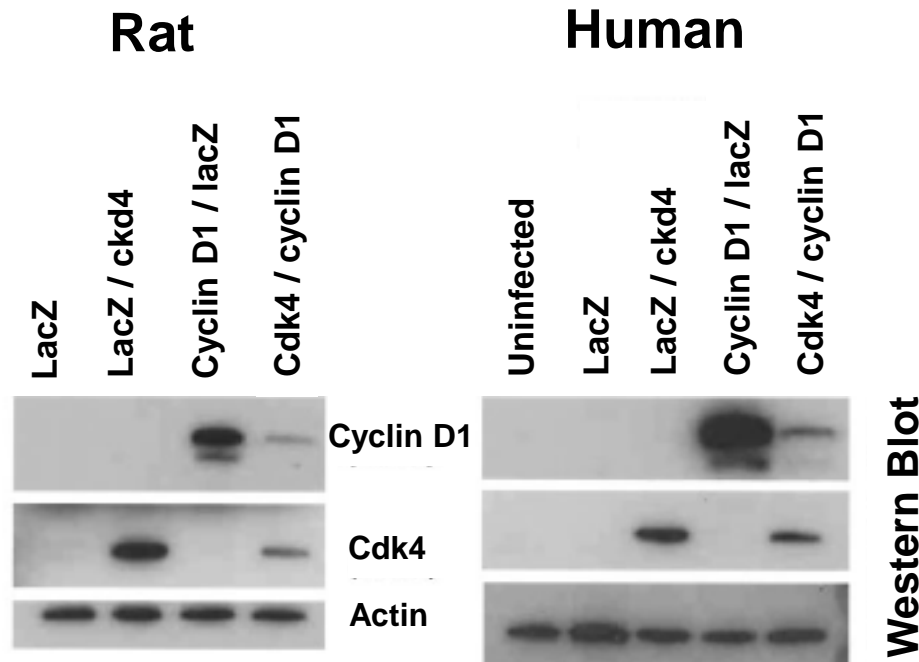


# Clonetics™ High-Quality Islets Transduction



- Human and mouse islets transduced dsAAV2-eGFP virus
- Transduced islets were able to reverse diabetes *In Vivo*

# Clonetics™ Islets and Western Blots



- Rat and human islets were transduced with different recombinant adenoviruses and assessed using immunoblots

# Clonetics™ Fresh Human Pancreatic Islets

Cat. No.	Description	Quantity
00201981	Fresh Human Pancreatic Islets, 100K	$\geq 100,000$ IEQ
00201983	Fresh Human Pancreatic Islets, 20K	$\geq 20,000$ IEQ
00201984	Fresh Human Pancreatic Islets, 10K	$\geq 10,000$ IEQ
00201985	Fresh Human Pancreatic Islets, 5K	$\geq 5,000$ IEQ
00202998	Fresh Human Pancreatic Islets, 2K	$\geq 2,000$ IEQ

- Special donor characteristics subject to donor availability; turnaround times may vary

# Clonetics™ Fresh Human Pancreatic Islets – Standard QC Testing

Part Number	Test	Minimum Specs Guarantee
Included	Islet Quantity	(IEQ Count)
Included	Islet Sterility	Gram Negative Stain on Day 0
Included	Islet Viability	[FDA/PI] (%) $\geq 70\%$
Included	Islet Purity	$\geq 70\%$ islet cells vs. other tissue (based on visual representation)

- COA also includes age, sex, race & BMI of the donor
- Islets test negative for Hepatitis B, Hepatitis C & HIV-1

# Clonetics™ Fresh Human Pancreatic Islets – Additional QC Testing

Cat. No.	Test	Typical Results (F.I.O.)	Estimated Testing Time (Results Post-Shipment)
00202551	DNA Quantitation	12.9 +/- 6.9 mg DNA	1 day
00202552	Glucose Stimulated Insulin Response	4.1 +/- 2.8 fold	4 days
00202553	Oxygen Consumption Rate	123.4 +/- 23.1 pmol/min/ $\mu$ g DNA	1 day
00202540	Beta-Cell Composition	48.4 +/- 9.4%	14 days

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# Cells on Demand™

## Human

- Fresh or Frozen Normal Acinar Tissue
- Frozen Normal Islets

## Pig, Monkey

- Fresh or Frozen Normal Islets and Acinar Tissue

For additional requests not listed above, please contact our Cells on Demand Service

**Inquiries:** [CellsonDemand@lonza.com](mailto:CellsonDemand@lonza.com)

# Lonza Cancer Product Portfolio

- Clonetics™ and Poietics™ Cells and Media tested and guaranteed to perform [www.lonza.com/primary](http://www.lonza.com/primary)
  - Primary cells from pancreatic, bone, blood, lymph, lung, mammary and other tissue types
- Nucleofector™ Technology for transfection of primary cells and cancer cell lines
- Clonetics™ Conditionally Immortalized Cell Lines (CCICs)
- Biowhittaker™ Liquid and Powder Media for cancer research and therapeutic applications
- Nucleic Acid and Protein Electrophoresis Products



# Summary

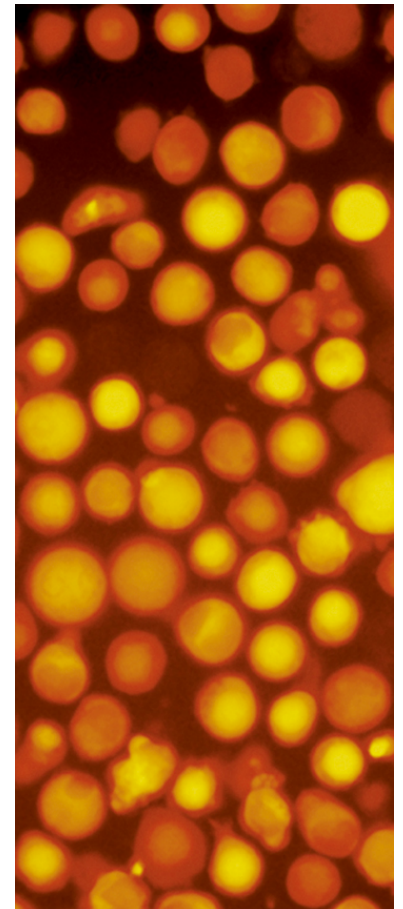
- Restricted access to normal primary human islets and limited cell line options for research use
- Lonza's Clonetics™ Human Pancreatic Islets
  - Fresh or frozen
  - Steady supply
  - Guaranteed quality
  - Flexibility
- Lonza's Cells on Demand™ Service
  - Acinar tissue
  - Pancreatic cells from animal species

# How to Order or Pose Questions

- Order queries:
  - U.S : 800 638 8174 (toll free) or [order.us@lonza.com](mailto:order.us@lonza.com)
  - Europe: +32 87 321 611 or [order.europe@lonza.com](mailto:order.europe@lonza.com)
  
- Scientific support:
  - U.S: +1 800 521 0390 or [scientific.support@lonza.com](mailto:scientific.support@lonza.com)
  - Europe: +32 87 321 611 or [scientific.support.eu@lonza.com](mailto:scientific.support.eu@lonza.com)
  
- Web address: [www.lonza.com/islets](http://www.lonza.com/islets) for more information

# Interested to Learn More?

- Join our upcoming webinar:
- **Efficient Transfection of Biologically Relevant Cells in Immunology Research**
  - Slot 1: Tuesday, 13 May 2014  
2 PM EDT (New York) / 11 AM PDT (Los Angeles)
  - Slot 2: Wednesday, 14 May 2014  
10 AM CEST (Berlin) / 9 AM BST (London) / 5 PM JST (Tokyo)
- Register at: [www.lonza.com/webinar16](http://www.lonza.com/webinar16)



**Thank You for Your Kind Attention**