

NYSE American: AGE

In Vivo Partial Reprogramming and induced Tissue Regeneration (iTR)

January 23, 2020

The matters discussed in this presentation include forward looking statements which are subject to various risks, uncertainties, and other factors that could cause actual results to differ materially from the results anticipated. Such risks and uncertainties include but are not limited to the success of Reverse Bioengineering and its parent company AgeX Therapeutics and its affiliates in developing new stem cell-based products and technologies; results of clinical trials of such products; the ability of Reverse and AgeX and its licensees to obtain additional FDA and foreign regulatory approval to market products; competition from products manufactured and sold or being developed by other companies; the price of and demand for such products; the ability of Reverse and AgeX and its subsidiaries to maintain patent and other intellectual property rights; and the ability of Reverse and AgeX to raise the capital needed to finance its current and planned operations. Any statements that are not historical fact (including, but not limited to statements that contain words) such as "will," "believes," "plans," "anticipates," "expects," "estimates") should also be considered to be forward-looking statements. As actual results may differ materially from the results anticipated in these forward-looking statements they should be evaluated together with the many uncertainties that affect the business of Reverse and AgeX and its other subsidiaries, particularly those mentioned in the cautionary statements found in AgeX's Securities and Exchange Commission filings. Reverse and AgeX disclaims any intent or obligation to update these forward-looking statements.





Recent Developments in Aging Research

Aging as Inevitable, Entropy



Aging as Reprogrammable



The Aging Developmental Program





Regen Med. 2019 Sep;14(9):867-886.

Twin Programming Technologies





Business Strategy

To lead in age programming technology:

- Reverse program the aging of cells *in vivo* to induce tissue regeneration (iTR[™])
- 2) Forward program cells *in vitro* for drug discovery (Cytiva[®]II)
- 3) LifeMap[®] age knowledgebase as companion to therapeutics



The Aging Developmental Program





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Somatic Cell Mortality & Immortality





Somatic Cell Mortality & Immortality





Expression of the Immortalizing Gene Telomerase

TERT





Expression of the Immortalizing Gene Telomerase





Some Initial Observations

The Nature of the Antagonistic Pleiotropy



Genes whose expression/lack of expression early in life confers a survival benefit, but late in life results in aging and mortality of the soma



Specific Association of Human Telomerase Activity with Immortal Cells and Cancer

Nam W. Kim,* Mieczyslaw A. Piatyszek,* Karen R. Prowse, Calvin B. Harley, Michael D. West, Peter L. C. Ho, Gina M. Coviello, Woodring E. Wright, Scott L. Weinrich,*† Jerry W. Shay*†

Synthesis of DNA at chromosome ends by telomerase may be necessary for indefinite proliferation of human cells. A highly sensitive assay for measuring telomerase activity was developed. In cultured cells representing 18 different human tissues, 98 of 100 immortal and none of 22 mortal populations were positive for telomerase. Similarly, 90 of 101 biopsies representing 12 human tumor types and none of 50 normal somatic tissues were positive. Normal ovaries and testes were positive, but benign tumors such as fibroids were negative. Thus, telomerase appears to be stringently repressed in normal human somatic tissues but reactivated in cancer, where immortal cells are likely required to maintain tumor growth.



Reverse Programming of Animal Cells

Aging as Inevitable, Entropy



Extension of Cell Life-Span and Telomere Length in Animals Cloned from Senescent Somatic Cells

Robert P. Lanza,^{1*} Jose B. Cibelli,¹ Catherine Blackwell,¹ Vincent J. Cristofalo,² Mary Kay Francis,² Gabriela M. Baerlocher,³ Jennifer Mak,³ Michael Schertzer,³ Elizabeth A. Chavez,³ Nancy Sawyer,¹ Peter M. Lansdorp,^{3,4} Michael D. West¹

SCIENCE VOL 288 28 APRIL 2000



Reprogramming the Aging of Human Cells





SKIN FIDRODIASTS IPS CEIIS

Time (Days)



A Data 77 p = 1e-14







The Aging Developmental Program







LIN28B





LIN28B

LIN28B





COX7A1

THERAPEUTICS

COX7A1



The Biology of Regeneration

Axolotls are abnormally stuck in an embryonic (larval) state throughout life, probably the basis of regenerative potential.





Current Topics in Developmental Biology, Volume 103:229

Waddington's Epigenetic Landscape





- There is a probable natural apoptosis of senescent cells before the Weismann Barrier
- If tissues can regenerate, then probable selective pressure to apoptose cells with genotoxic damage
- If restricted regeneration, then
 keep cells but arrest proliferation
- Result is accumulation of senescent cells with time





Cell Age Reversal In Vitro



Cell Age Reversal In Vivo





Reverse Programming the Aging of Human Cells





iTR Strategy



Twin Strategies in Development



ReCyte1 EC Cell Line

Exosomes

In Vivo Applications



Forward Programming of Human Cells



Target Cytiva II



Forward Programming the Aging of Human Cells



Drug	Class	Withdrawn
Terfenadine	Antihistamine	1998
Sertindole	Antipsychotic	1998
Astemizole	Antihistamine	1999
Grepafloxacin	Antibiotic	1999
Cisapride	Prokinetic	2000
Droperidol	Tranquilizer	2001
Levomethadyl	Opiate Dependence	2003
Rofecoxib	NSAID	2004
Tegaserod	Prokinetic	2007
Sibutramine	Appetite Suppressant	2010
Rosiglitazone	Antidiabetic	2010



Forward Programming of Cancer Cells



Therapeutic & diagnostic uses of technology provide a broad pan-cancer platform that company plans to partner







Forward Programming of Cancer Cells



Therapeutic & diagnostic uses of technology provide a broad pan-cancer platform that company plans to partner



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LifeMap Databases & mHealth

Knowledgebases Business Unit The GeneCards Suite Knowledgebase

- Integrated biomedical knowledgebase of human genes, variants, proteins, cells, biological pathways, diseases, and the relationships between them.
- User base: >3.5M unique users from 3,000 universities, hospitals, research institutions and biomedical companies
- Customers: >45 large biotech/pharma



Abbvie	Amgen	Biogen-Idec	Celgene				
Cell Signaling	Jannsen	Abcam	EPO				
Evotec	GeneTex	Genentech	Gilead				
GSK	Japan Tobacco	JPO	Millenium				
EMD Millipore	Novus	Novartis	Origene				
R&D Systems	Sanofi-Aventis	Santa Cruz	Servier				
Thermofisher	USPTO						





LifeMap Precision mAge Health



• Licensing of Knowledgebases and Advertising



Precision Gerontology

- Cloud-based analysis of NGS data in a Software as a Service business model
- We have mapped ~1,000 proprietary epigenetic markers associated with aging and cancer





LifeMap

Product Pipeline





Company Quick Facts

Founded 2017

Contact Details

965 Atlantic Avenue Alameda, CA 94501 Tel: +1 (510) 671-8370 Stock Listing NYSE American: **AGE** Market Cap (1/14/20) ~\$70M

EXECUTIVE MANAGEMENT

Michael D. West, Ph.D. Chief Executive Officer Founder and first CEO Geron Corporation Gregory Bailey, M.D., Chairman of the Board Co-founder Ascent Health Care, Board of Medivation Nafees Malik, M.D., Chief Operating Officer Head of Cell and Gene Therapies at Juvenescence Russell Skibsted, M.B.A. Chief Financial Officer Lineage Cell Therapeutics, Spectrum Pharmaceuticals, Hana Biosciences, Asset Management Company Aubrey de Grey, Ph.D., VP, New Technology Discovery. Chief Science Officer, SENS Research Foundation.

INVESTOR CONTACT

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- iTR[™] Induction of regeneration and reversal of age markers in tissues afflicted with age-related degenerative disease
 - Potential to reverse program the aging of cells and tissues in vivo
 - Large opportunity in forward therapeutic programming of cancer with companion diagnostic
- Near-term commercial opportunities:
 - Cytiva II proprietary adult cardiac cells for drug screening
 - LifeMap Sciences Tgex NGS products provides companion monitoring technology for precision interventional gerontology

