August 19, 2013

OUTPERFORM

Reason for report:

INITIATION

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LEERINK SWANN

HEALTHCARE EQUITY RESEARCH

CELLULAR DYNAMICS INTERNATIONAL

Industry Poised for Growth, Initiate at Outperform

• **Bottom Line**: We are initiating coverage of Madison, Wisconsin-based Cellular Dynamics International (ICEL) with an Outperform rating. ICEL is well positioned to capitalize on the growing adoption of induced pluripotent stem cells (iPSCs) among biopharmaceutical companies for compound screening and toxicity testing. The company already counts 18 of the top 20 pharmaceutical companies as customers and recently was awarded a large grant by the California Institute for Regenerative Medicine (CIRM). Our $15 price target reflects a view that ICEL will enjoy rapid revenue growth over the next several years.

• **Platform technology offers improved drug development workflow.** ICEL's iPSCs promise improvements versus traditional methods of compound screening in biopharma drug development. Peer-review research has suggested that iPSC technology could accelerate the pace of drug discovery, as well as reduce the costs for drug development and the prevalence of late-stage drug failures.

• **Big pharma is increasingly adopting ICEL's technology.** ICEL's customers include 18 of the top 20 biopharma companies. Two of these customers, Eli Lilly (OP) and AstraZeneca (MP), have entered broad strategic collaborations (i.e., center of excellence [COE] agreements) with ICEL in the past year.

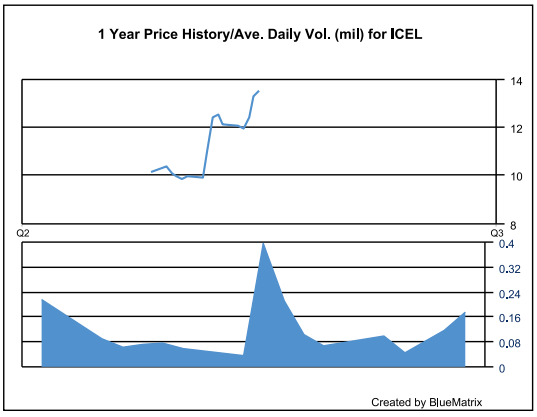
• **Several signposts suggest iPSC adoption is poised for growth.** We believe that the increasing financial resources dedicated to iPSC research worldwide are signposts that support the technology's increased importance as a research tool.

• **iPSC technology provides potential solutions to hESC concerns.** Restrictions on and reservations regarding human embryonic stem cell (hESC) research, while diminished nowadays, still exist. Cellular Dynamics's iPSC technology circumvents any ethical dilemma from sourcing stem cells from human embryos and permits a broader range of human research.

• **Broad intellectual property (IP) estate.** ICEL owns or licenses a portfolio of patent rights that exceeds 700 patents and patent applications in the United States and around the world.

• **Pace of product and customer penetration the greatest near-term uncertainty.** We believe the greatest near-term risk to ICEL's business is uncertainty pertaining to the rate at which the company can drive increased sales volume to its existing customer base and to new accounts.

Key Stats:	**(Symbol:ICEL)**
S&P 600 Health Care Index:	**1,087.73**
Price:	**$13.53**
Price Target:	$15.00
Methodology:	~7x EV/sales (ex CIRM) for TTM Jun-15E
52 Week High:	$14.47
52 Week Low:	$9.50
Shares Outstanding (mil):	16.3
Market Capitalization (mil):	$220.5
Book Value/Share:	$5.31
Cash Per Share:	$5.21
Dividend (ann):	$0.00
Dividend Yield:	0.0%



Dec Yr	1Q	2Q	3Q	4Q	FY Rev	1Q	2Q	3Q	4Q	FY EPS	P/E
2012A	$1.1	$1.3	$1.2	$2.9	$6.6	--	--	--	--	($1.32)	NM
2013E	$2.4A	$2.8	$2.7	$5.3	$13.1	($0.48)A	($0.52)	($0.45)	($0.48)	($1.92)	NM
2014E	--	--	--	--	$33.1	--	--	--	--	($1.25)	NM
2015E	--	--	--	--	$56.6	--	--	--	--	($1.02)	NM

Source: Company Information and Leerink Swann LLC Research
Revenues in millions.
GAAP EPS.

INVESTMENT THESIS

We are initiating coverage of Madison, Wisconsin-based Cellular Dynamics International (ICEL) with an Outperform rating and a $15 price target. ICEL is well positioned as the leading commercial supplier of differentiated human cells derived from induced pluripotent stem cells (iPSCs). We believe cells derived from iPSCs will become increasingly utilized for compound screening and toxicity testing in the biopharmaceutical industry, among other applications. Several signposts suggest the iPSC industry is poised for rapid growth.

INVESTMENT POSITIVES

Pioneering Technology for iPSC Development

Platform technology offers improved drug development workflow. ICEL's iPSCs promise improvements versus traditional methods of compound screening in biopharma drug development. Peer-review research has suggested that iPSC technology could accelerate the pace of drug discovery, as well as reduce the costs for drug development and the prevalence of late-stage drug failures. We consider ICEL a platform technology company in an area poised for rapid growth.

Big pharma is increasingly adopting ICEL's technology. ICEL's customers include 18 of the top 20 biopharma companies. Two of these customers, Eli Lilly and AstraZeneca, have entered broad strategic collaborations (i.e., center of excellence [COE] agreements) with ICEL in the past year. Additionally, ICEL's average annual revenue from its top 10 accounts has grown from $179K in 2011 to $516K for the trailing twelve months (TTM) ended 3/31/13, indicative of increased adoption of ICEL's products among large biopharma companies.

Several signposts suggest iPSC adoption is poised for growth. We believe that the increasing financial resources dedicated to iPSC research worldwide are signposts that support the technology's increased importance as a research tool. For example, Japan's recent stimulus program allocated ¥21.4B in funding to iPSC research, and the government is expected to announce a 10-year, ¥90-billion iPSC initiative in next year's budget. Europe has funded 407 stem cell research projects under the Seventh Framework Programme (FP7), an increase from 102 projects under the Sixth Framework Programme (FP6); the National Institutes of Health's (NIH) FY2014 budget stressed the importance of regenerative medicine, and highlighted work with iPSCs is one particularly exciting area of regenerative medicine. Finally, the California Institute for Regenerative Medicine (CIRM) recently endorsed the potential of iPSCs as disease models with the award of $26M+ to generate and bank iPSCs from 3,000 donors (much of this award went to ICEL).

iPSC technology provides potential solutions to hESC use. Restrictions on and reservations regarding human embryonic stem cell (hESC) research, while diminished nowadays, still exist. Cellular Dynamics's iPSC technology circumvents any ethical dilemma from sourcing stem cells from human embryos and permits a broader range of human research. The potential to model cell lines that reflect genotypically and phenotypically unique and uncommon diseases states overcomes the limitations of hESC lines for highly specific genetic or ethnic clinical challenges.

Broad intellectual property (IP) estate. ICEL owns or licenses a portfolio of patent rights that exceeds 700 patents and patent applications in the United States and around the world. All of its licenses include commercialization rights in at least research tools, and the right to deliver license rights to its customers for the products that it sells to them. While many of these patents are non-exclusive and we don't believe the portfolio meaningfully precludes "home-brew" methods, we consider it a barrier to entry versus other potential commercial vendors of iPSCs.

INVESTMENT RISKS

Revenue Ramp the Greatest Uncertainty

Pace of product and customer penetration is the greatest near-term uncertainty. We believe the greatest near-term risk to ICEL's business is uncertainty pertaining to the rate at which the company can drive increased sales volume to its existing customer base and to new accounts. Historically, ICEL's sales cycle has varied widely and has exceeded 12 months in some instances. Additionally, biopharma companies are notoriously slow to change established methods of clinical validation, especially when existing methods appear in FDA guidance documents. We believe ICEL has frequently missed its internal quarterly and annual projections given the complexity of its sales cycle and customer base.

Customer concentration. While ICEL's customer base is growing rapidly (128 customers at 2012-end versus 60 at 2011-end), the company's top 10 customers comprise the vast majority of its revenue. For the twelve months ended March 2013, ICEL's top 10 customers comprised ~82% of its product revenue. We believe this concentration will lead to some lumpiness on the top line, as order patterns and internal project prioritization can have a material impact on ICEL's quarterly results.

Insourcing by current and future customers. ICEL's biggest competitor is "home-brew" methods of iPSC development, and we believe one of its biggest commercialization challenges is convincing biopharma companies that they cannot adequately develop iPSCs in-house. We believe all large biopharma companies have begun their own internal iPSC programs over the past several years with varying degrees of success. However, we expect large biopharma companies will be challenged to scale internal methods of iPSC development more often than not, and ICEL has already scored some notable conversions for scale-up purposes.

New market opportunity may not develop as quickly as we expect. While iPSC applications for compound selection, safety, toxicology, disease research, and stem cell banking are infant yet visible market opportunities, we believe therapeutic applications based upon stem cell technology are much less visible. Revenue from supply of original equipment manufacturer (OEM) iPSCs for therapeutic research applications comprises 9% and 16% of our 2014 and 2015 revenue estimates, respectively, though we acknowledge that we have little visibility on this revenue source, and ICEL has not entered into any therapeutic partnerships to date. A clinical study being proposed in Japan (using iPSCs to treat severe age-related macular degeneration) will likely be the first trial balloon to demonstrate the safety and effectiveness of using iPSCs for clinical therapy. In June, a government committee in Japan approved proposals for this clinical trial, which

could begin as early as FY2014 (which in Japan begins April 2014). We believe the success or failure of this clinical trial will direct further therapeutic interest in iPSCs.

COMPANY PROFILE

Novel Technology With Expanding Cellular Biology Applications

Cellular Dynamics International (ICEL) develops and manufactures fully functioning human cells in industrial quantities to precise specifications. Customer uses for these cells include drug discovery and screening, safety/toxicity testing, and stem cell banking, among others.

ICEL in its current form reflects the 2008 merger of sister companies Cellular Dynamics International and Stem Cell Products, Inc. (SCP), founded in 2004 and 2005, respectively. The company's scientific founder, Dr. James Thomson, is a pioneer in the stem cell field. Dr. Thomson directed the group that reported the first isolation of embryonic stem cell lines from a non-human primate in 1995, work that led his group to the first successful isolation of human embryonic stem cell lines in 1998. In 2007, Dr. Thomson's lab reported (contemporaneously with Dr. Shinya Yamanaka) the first isolation of human induced pluripotent stem cells (iPSCs).

ICEL currently markets four different cell types: cardiomyocytes, endothelial cells, neurons, and hepatocytes. The company also creates custom iPSC lines according to customer specifications. We believe the company derives most of its revenue from biopharmaceutical companies, though it also counts independent research institutions and academic/government funded labs as customers.

The company's revenue model relies upon new customer penetration and increased sales to current customers. In 2012, ICEL had 128 customers, up from 60 in 2011, including 18 of the top 20 biopharmaceutical companies. The average annual revenue for ICEL's top 10 customers increased from $179K in 2011 to $516K for the trailing twelve months (TTM) ended 3/31/13. During 2011 and 2012, three customers accounted for greater than 10% of total revenue in one or both years. Eli Lilly (Lilly) accounted for 10% of total revenue in 2011 and 18% of total revenue in 2012. Roche accounted for 13% of total revenue in 2011, and GSK (MP) accounted for 11% of ICEL's total revenue in 2012. Lilly and AstraZeneca each comprised 16% of ICEL's total revenue for the March 2013 quarter.

ICEL has 29,000 square feet of office and lab space in Madison, WI and an additional 1,900 of space in its satellite office in Novato, CA, comprising 2,000 square feet of iPSC manufacturing space. The company had 115 employees including 56 in research and development, 20 in production, and 26 in sales and marketing as of 3/31/13. In 2012, the U.S. comprised 66% of the company's sales, followed by 24% in Europe, 5% in Japan, and 5% from rest-of-world (ROW).

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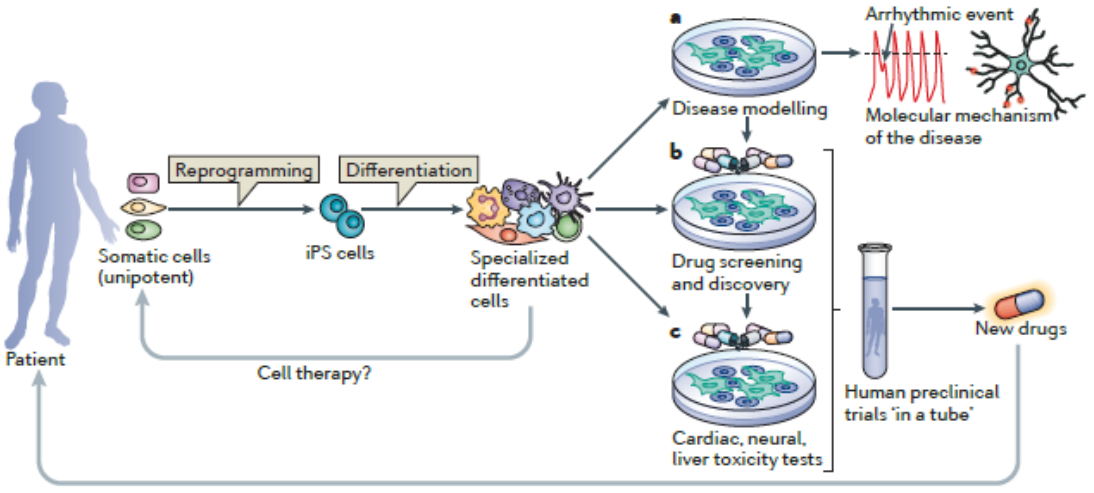
MARKET LANDSCAPE FOR iPSCs

Scientific Advancements Create the Capability

The confluence of pioneering discoveries by Dr. James Thomson and Nobel Prize winner Dr. Shinya Yamanaka, the development of cell analytical tools, and increasingly supportive policy across states supports the role of stem cell research in scientific discovery and translation, in our opinion. The premise supporting greater iPSC adoption is that it averts the ethical dilemma of using hESCs while still enabling an in vitro, pluripotent raw material that can differentiate into human cells and more accurately model human biology versus surrogate cell research methods. iPSC cell lines can emanate from somatic cells acquired from various sources of tissue including skin, blood, fat, etc. The cells are then reprogrammed by controlling gene expression to produce targeted cells of interest. In principle, iPSCs can be differentiated into any cell type in the body. The concept also enables a replica of specific disease phenotypes and genetic footprints when specified. Human iPSCs can be used in disease modeling to improve the understanding of molecular pathways underlying disease phenotypes, e.g., the molecular causes for arrhythmia in cardiomyocytes. Another application is in drug screening and discovery, to determine the effects of candidate drugs and new compounds, and to identify target pathways. iPSCs can also be valuable in cardiac, neural, and liver toxicity tests to assess cellular toxic responses. Drug screening and toxicity tests together represent human preclinical in vitro “trials” that model the biology of the patient in very early stages of the drug discovery process that are infeasible under surrogate methods. The following table represents a high level overview of iPSC production and applications.

Human iPS Cell Derivation, Differentiation and Applications



Source: Bellin M, Mummery C, et al., 2012. Induced pluripotent stem cells: the new patient? Nature Reviews Molecular Cell Biology. 13, 713–726.

Deficiencies of Alternative Models Create the Need

The evolution of iPSC technology provides access to fully functioning human cells. As fully functioning human cells, iPSCs show promise as a substitute to surrogate methods of research (e.g., cells derived from human cadavers or sacrificed animals, transformed [immortalized] cells and live animals). Historically, researchers have used these surrogate cells in disease modeling and drug discovery to understand and predict the behavior of human cells. However, surrogate methods have proved to be an imprecise and costly media for studying human biology, as evidenced by the slower pace of drug discovery, higher costs for drug development, and prevalence of late-stage drug development failure. Our highlights of some of the shortfalls of surrogate methods versus iPSCs follow:

- ***Primary cells***: Primary cells are generally harvested from either sacrificed animals or human cadavers. Animal cells are fundamentally different from the human cells they are meant to approximate (e.g., the average resting heart rate for a mouse is 500 bpm). Human cadaver cells are highly variable in quality due to variation in donor genotype, phenotype, and the timing and condition of the organ at harvest. Also, human cadaver cells behave differently in vitro than in vivo.
- ***Transformed cell lines***: Transformed cell lines are cells that have either been isolated from a tumor or genetically induced to become immortal, and tend to grow indefinitely in vitro. Transformed cells differentiate rapidly and lose the inherent physiological characteristics of the donor organ and cease to replicate the biology of the source organ or individual. Transformed cells also exhibit genetic instability, routinely adding, deleting, or swapping chromosomes, which give the altered cell a selective growth advantage in vitro, and changing the cells' physiology.
- ***Live animals***: Live animals have been widely used as a surrogate for human biology to predict drug safety and activity in humans. The biology of animals is fundamentally different than that of humans and thus is not a perfect model to extrapolate to human physiology. Also, certain markets (e.g., Europe) have enacted legislation to eliminate certain applications using animal research to appease ethical concerns.

Signposts Point to Growth Inflection

We believe that the increasing financial resources dedicated to iPSC research worldwide are signposts that support the increasing importance of iPSC technology. Europe, Japan, and public/private partnerships have recently announced or increased funding for iPSCs. Our highlights of some of these initiatives follow:

- *Europe*: the European Union has funded 407 stem cell research projects under the Seventh Framework Programme (FP7), up materially from the 102 projects funded under the Sixth Framework Programme (FP6);
- *Japan*: the recent stimulus program allocated ¥21.4B in funding to iPSC research, with ¥4.0B directed toward Dr. Yamanaka's Center for iPS Cell Research and Application. Also, the government is expected to announce a 10-year, ¥90-billion iPSC initiative in next year's budget;

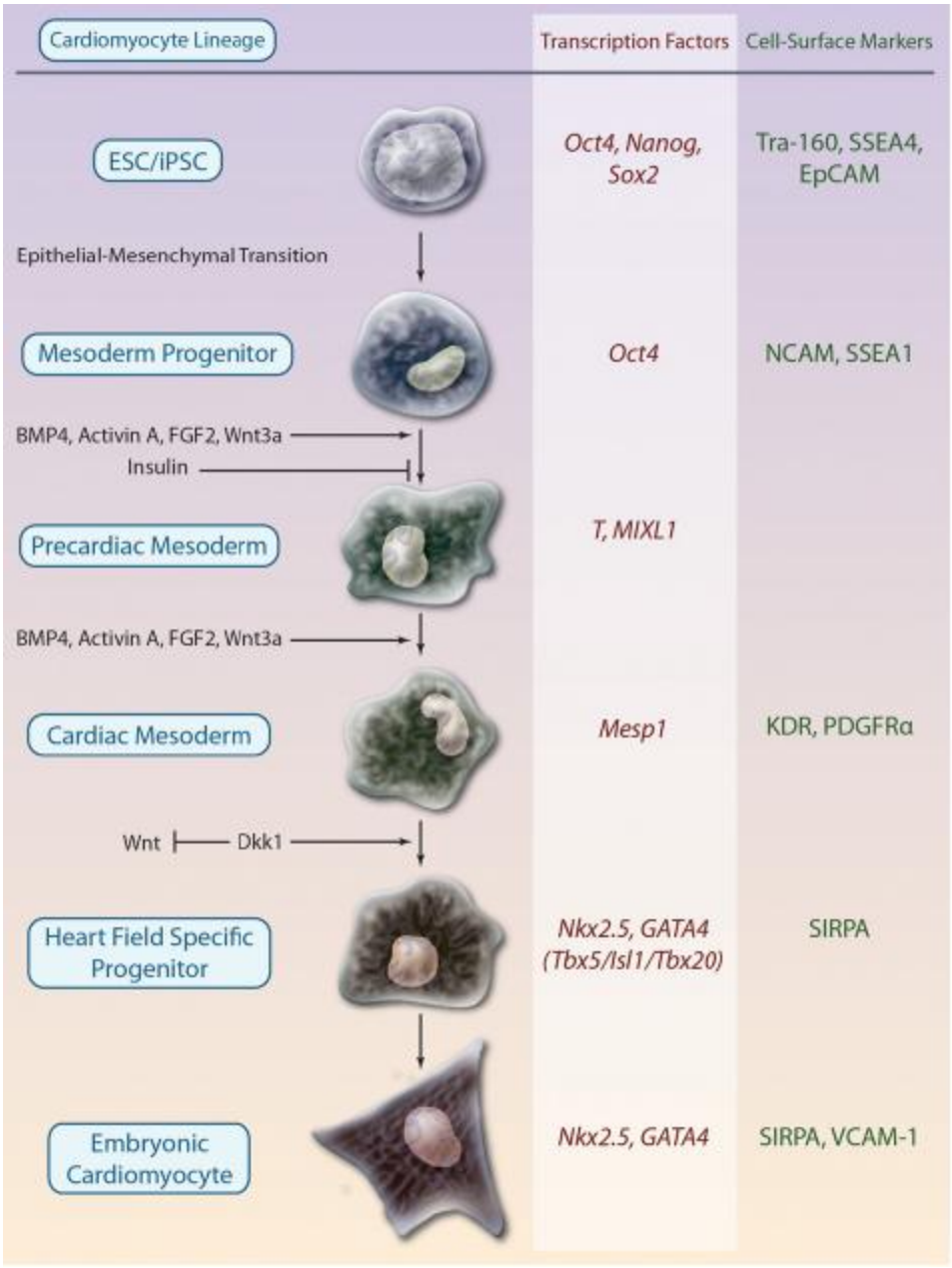
- *United States*: the NIH's FY2014 budget stressed the importance of funding regenerative medicine, and highlighted work with iPSCs is one particularly exciting area of regenerative medicine;
- *Public/private initiatives*: the California Institute for Regenerative Medicine (CIRM) awarded $26M+ to generate and bank iPSCs from 3,000 donors (most of this award went to ICEL). Also, the Innovative Medicines Institute (IMI) in Europe launched the €55.6M StemBANCC project to generate and characterize 1,500 iPSC lines for disease research and to test for drug efficacy and safety.

CELLULAR DYNAMICS' APPROACH TO THE MARKET

High Volume, Consistent Quality Are Cornerstones of ICEL's Value Proposition

The process of creating iPSCs and differentiating them into functional cells takes weeks and resembles to us as much art as science. Cell differentiation occurs in sequential stages, the progression through which one must control by dosing the cell with various biochemicals. One also must perform quality control checks (i.e., measure gene expression, cell surface markers) along the way to make sure that differentiation is occurring according to plan. The following table illustrates one process for differentiating cardiomyocytes from iPSCs.

Model of differentiation of human pluripotent stem cells to cardiomyocytes



Source: Mummery, C et al., 2012. Differentiation of Human Embryonic Stem Cells and Induced Pluripotent Stem Cells to Cardiomyocytes: A Methods Overview , Circulation Research. 111, 344–358.

A key thrust of ICEL's value proposition is the industrialization and standardization of these processes to manufacture cells in high volumes at consistent specifications. ICEL can currently manufacture ~70B iPSCs/month, including two of the following differentiated cell types simultaneously: iCell Cardiomyocytes (30B/month), iCell Endothelial Cells (20B/month), iCell

Neurons (30B/month), and iCell Hepatocytes (20B/month). We believe this manufacturing capacity, with commercial precision, far exceeds competitors'.

This assumption is supported in part by CIRM's decision to award ICEL a grant to manufacture human iPSC lines from 3,000 donors to investigate multigenic diseases. The following table offers some highlights from CIRMs' decision.

Select CIRM comments in response to proposals for iPSC generation

Applicant		Summary of selected commentary
ICEL	(+)'s	Plan well described, thorough, provides confidence it can be achieved. The proposed level of automation is appropriate and process has been well developed. Focus on peripheral blood as the cell source is appreciated; easier to obtain blood than skin from tissue donors. The proposed molecular method to verify genomic integrity of hiPSCs is suitable for large-scale efforts such as this. An excellent quality control system is in place at the applicant institution that will be transferred to the California location. The applicant institution has previously successfully generated and characterized large numbers of hiPSC lines using multiple methods. The project director has an impressive record of managing large cell culture-based scientific projects at the applicant institution.
Non-profit A	(-)'s	Approach does not avoid the risk of transgene integration, which could interfere with subsequent analysis of disease phenotypes. Reviewers strongly questioned the rationale for choosing a transformed cell line as a back up cell type for hiPSC derivation.
Non-profit B	(-)'s	Insufficient protocol details provided to offer comfort on cell quality and verification of pluripotency. Automation proposed is not yet routine. Therefore, more detailed information on the proposed automation system is necessary. Evidence of the ability to perform large-scale derivations is still lacking.
Non-profit C	(-)'s	Concern that the specific protocols used would prove less effective with peripheral blood-derived cells. Limited amount of information on characterization approach. Proposed modifications to the applicant's existing data tracking system might prove insufficient for managing project scale. Proposed quality control measures perhaps too strict. Without automation, highly unlikely that the goal of generating 9000 hiPSC lines will be met. Applicants might have underestimated the number of staff that will be required to generate 9,000 lines.
Commercial A	(-)'s	Proposal does not include automation for cell culture. Clone selection proposal is less scalable than other approaches. Applicant focus is distinct from the proposed effort, raising some concern regarding the overall commitment of the company to this proje Applicant proposes to generate cell lines from only 1,517 individual donors based on budgetary constraints.
Non-profit D	(-)'s	Reviewers did not support the applicant's claim that characterization of derived hiPSC can be limited to one line per tissue donor. The proposed pluripotency assays have drawbacks. The cell identity assay has drawbacks, which introduce the potential for error. Very few details on Documentation and Quality Control are provided in the application. Overall diffuse approach across several laboratories raises feasibility concerns. Does not define a historical hiPSC derivation success rate, of concern as the proposed derivation method has not been widely used. The project director lacks experience in managing a large-scale hiPSC generation program.

Source: California Institute for Regenerative Medicine
hiPSCs: human induced pluripotent stem cells

Compared to competitive proposals, reviewers for the CIRM grant viewed favorably ICEL's experience and ability to manufacture iPSCs in large quantities, and also viewed favorably its episomal reprogramming method for producing iPSCs.

A recent paper published by researchers from GSK further supports the value and uniqueness of ICEL's high volume capabilities. GSK researchers used iCells in conjunction with internally developed iPSCs to discover a new target for Alzheimer's drugs. Because large quantities of iCells were available, GSK was able to screen a chemical library containing several hundred compounds and discovered several small molecules that could potentially inhibit Alzheimer's progression. The authors specifically noted that the availability of large batches of iCell Neurons

with consistent quality enabled this small molecule screen, which suggests to us that the capability to produce iPSCs in volume to consistent specification was additive to GSK's internal capabilities.

ICEL's primary customers today are biopharmaceutical firms and other life sciences labs performing early-stage, in vitro research for drug development. The company is also leveraging its cell manufacturing capability to supply stem cell banking firms with lines of interest. Its tertiary market is to develop stem cell lines targeted for in vivo cellular therapeutic use. Our brief discussion of each of these follows:

- ***Cells for compound assessment*:** ICEL's primary market is currently targeted toward in vitro study of compound discovery, toxicity testing, and chemical safety analysis. Customers include the biopharmaceutical industry, as well as independent and academic researchers. Since iCells resemble functional human cells, they more closely model human biological pathways compared to substitute research methods that use human cadaveric tissue, immortalized cell lines, and animal models.
- ***Stem cell banking*:** ICEL creates stem cell lines for institutions that wish to pursue iPSC research without investing in the manufacturing capacity to create iPSC lines with the purity of ICEL's cell lines. Theoretically, ICEL's manufactured stem cells can be cryopreserved indefinitely (ex hepatocells). This provides an opportunity for ICEL to manufacture and supply genotypically and phenotypically diverse cell lines to institutions with stem cell banking operations. A number of public and private organizations are funding stem cell banking research worldwide. In March 2013, ICEL entered this market with a $16M landmark grant from the California Institute for Regenerative Medicine (CIRM). The grant requires ICEL to derive three iPSC lines from each of 3,000 different individuals, and upon creation, these iPSC lines will be owned by CIRM. The company will also be the primary subcontractor on the $10M grant the Coriell Institute for Medical Research received from CIRM to store and expand the Coriell iPSC bank.
- ***Cells for in vivo and therapeutic research*:** ICEL also plans to produce cells used in cures for debilitating disorders or to regenerate damaged organs. While still early stage, peer-reviewed research that identifies advantages to using iPSC lines versus other research models provides an opportunity for ICEL to further capitalize on its production IP as science advances. A clinical study being proposed in Japan will likely be the first trial balloon to demonstrate the effectiveness in using iPSCs for clinical therapy. Dr. Masayo Takahashi, an ophthalmologist at the RIKEN Centre for Developmental Biology in Kobe, Japan, plans to transplant iPSC cells into patients who have severe age-related macular degeneration, a common cause of blindness. Dr. Takahashi plans to take small skin samples from the upper arm and add proteins that reprogram the cells into iPSC cells. Other factors will transform the iPSC cells into retinal cells. Then a small sheet of cells will be placed under the damaged area of the retina, where, if successful, the cells will grow and repair the pigment epithelium. The researchers hope that the transplants slow or halt the disease, but their primary goal is to show that the cells are safe. Santa Monica, CA-based Advanced Cell Technology (ACT) is also planning a clinical trial of iPSCs. The study would inject healthy patients with platelets derived from iPSC cells and from hESCs to see if they act like normal platelets, which could open the way to a treatment for blood-

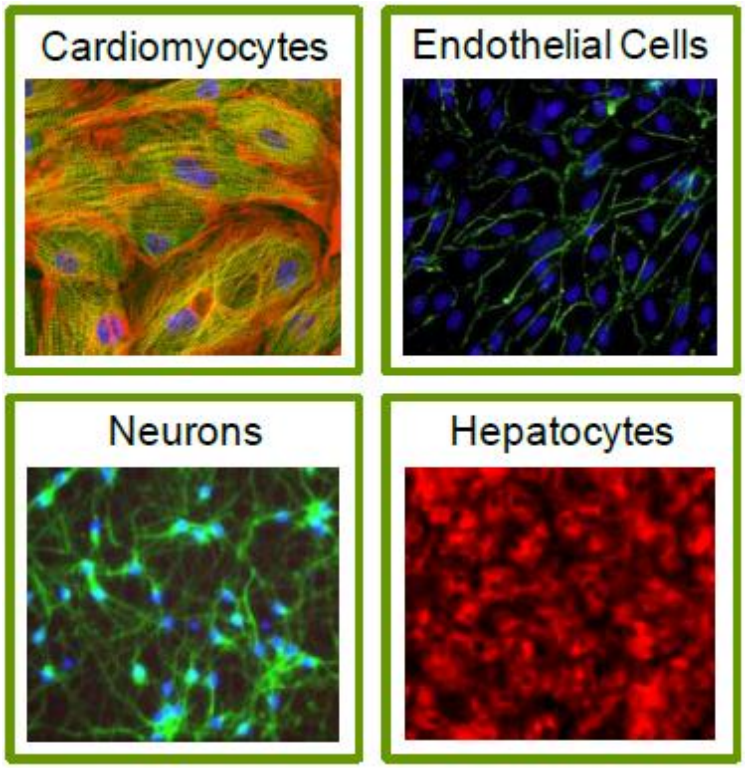
clotting disorders. We believe these two studies will be watched closely to assess the therapeutic potential of iPSC technology.

CURRENT PRODUCT OFFERING HAS PLENTY OF ROOM TO GROW

Stable of Products Absent Therapeutic Development Risk

Cellular Dynamic's iCell product line currently consists of four well-researched areas of focus. ICEL also manufactures customized cells according to customer specifications and markets kits for the production of iPSC lines.

iCell Products



Source: Cellular Dynamics

iCell Cardiomyocytes: ICEL's iCell Cardiomyocytes (47% of 1Q:13 revenue), launched in December 2009, are highly purified human heart cells that provide a biologically relevant model system for in vitro drug discovery, toxicity testing, and chemical safety, and other applications. Customers use iCell Cardiomyocytes for electrophysiological studies, toxicity studies, stem cell banking, and comparative analysis versus animal studies.

A study published by Roche offers evidence for the clinical validity for ICEL's iCell Cardiomyocytes. Using predicted pro-arrhythmia score (PPS) as a proxy for arrhythmogenesis (heart arrhythmia), the study identified two compounds (Ouabain and Aconitine) which were falsely presumed safe using conventional testing assays, but correctly identified as pro-arrhythmic using the PPS score derived from iCells. Additionally, the existing assays suggested several compounds as pro-arrhythmic which either clinically were not or at least ambiguous, and these drugs were correctly identified as such with the PPS score.

PPS - A Calculation to Predict Clinical Arrhythmogenic Risk

Drug	PPS	hERG	QT	Clinical Arrhythmia
Ouabain	5667	(-)	(-)	(+)
Aconitine	2567	(-)	(-)	(+)
Quinidine	2158	(+)	(+)	(+)
Dofetilide	2000	(+)	(+)	(+)
Flecainide	1931	(+)	(+)	(+)
Erythromycin	1135	(+)	(+)	(+)
Terfenadine	1000	(+)	(+)	(+)
Thioridazine	594	(+)	(+)	(+)
RO5657	555	(+)	(+)	(+)
Sotalol	491	(+)	(+)	(+)
Cisapride	429	(+)	(+)	(+)
E-4031	433	(+)	(+)	(+)
Astemizole	262	(+)	(+)	(+)
Ranolazine	60	(+)	(+)	(-)
Alfuzosin	56	(-)	(+)	(-)
Fluoxetine	NA	(+)	(+)	(-)
Moxifloxacin	NA	(+)	(+)	(±)
Amiodarone	NA	(+)	(+)	(±)
Verapamil	NA	(+)	(±)	(-)
Captopril	NA	(-)	(-)	(-)
Nifedipine	NA	(-)	(-)	(-)
Amoxicillin	NA	(-)	(-)	(-)
Rofecoxib	NA	(-)	(-)	(-)
Aspirin	NA	(-)	(-)	(-)

Source: Guo L, Abrams R, et al., 2011. Estimating the risk of drug-induced proarrhythmia using human induced pluripotent stem cell-derived cardiomyocytes. Toxicol. Sciences. 123, 281–289. Cellular Dynamics

The authors concluded that the PPS score accurately separated the tested compounds known to be safe and those with known contraindications in the clinic. These findings support the use of ICEL's cardiomyocytes as a safety test in compound development and could at minimum award ICEL's cardiomyocytes a place alongside traditional cardio-safety assays such as hERG (i.e., human ether-à-go-go-related gene, a gene which encodes a potassium channel involved in cardiac repolarization) and QT measurements (QT interval describes the duration of ventricular depolarization and repolarization on an electrocardiogram). Because drug-induced adverse cardiovascular events are the #1 cause of drug withdrawal, limitation, or development termination, ICEL's cardiomyocytes address an important market need.

While the existing pro-arrhythmia assays have drawbacks, they are nonetheless strongly recommended by the regulatory agencies for all small molecules prior to entry into clinical development. In 2005, the FDA issued two guidance documents recommending, at a minimum, that all compounds be tested for QT prolongation potential in a preclinical hERG assay and in a tQT trial. A compound's ability to block the hERG potassium ion channel in vitro is considered a strong indication it will cause QT prolongation in animals and humans. However, as the Roche data show, this is an imperfect assumption.

A recent meeting organized by the U.S. Food and Drug Administration (FDA), the International Life Sciences Institute's Health and Environmental Sciences Institute (HESI), and the Cardiac Safety Research Consortium (CSRC) led to the proposal of a new method using stem cell-derived cardiomyocytes to improve the identification of compounds that cause pro-arrhythmia side effects. The proposal suggests developing a preclinical assay consisting of three basic components, including: (1) computational modeling of cardiomyocytes; (2) stem cell-derived cardiomyocytes; and (3) voltage clamp studies. The new assay would replace the preclinical hERG assay and thorough QT (tQT) trial recommended under current FDA guidance. The Director of the FDA's Center for Drug Evaluation and Research (CDER) Division of Cardiovascular and Renal Products hopes to implement the new assays and withdraw the current guidance which recommends tQT studies by July 2015, though some have suggested this timetable is ambitious. New FDA guidance would likely meaningfully increase adoption of ICEL's cardiomyocytes.

iCell Neurons: ICEL's iCell Neurons (23% of 1Q:13 revenue), launched December 2011, are highly purified human neurons typical of the forebrain. These products provide an in vitro model system for pre-clinical drug discovery for neurodegenerative disorders such as Alzheimer's disease, Parkinson's disease, and Huntington's disease among others. Customers use iCell Neurons to model Alzheimer's disease for compound screening and for comparative analysis for botulinum neurotoxin potency versus animal models.

GSK utilized iCell Neurons to identify several small molecules as effective blockers of the toxicity caused by the abnormal protein deposits associated with Alzheimer's disease, suggesting new ways to develop medicines for Alzheimer's disease. It was the first peer-reviewed publication of a high-throughput toxicity screen using iPSC-derived neurons.

iCell Endothelial Cells: ICEL's iCell Endothelial Cells, launched September 2011, are interior surface blood vessel cells used for vascular biology research including angiogenesis, atherosclerosis, inflammation, and other life science research. Customers order iCell Endothelial Cells for modeling viral infectivity, vascular disease, and stroke in vitro; and for tissue engineering studies and preliminary regenerative medicine applications to vascularize three-dimensional matrices or decellularized organs for tissue engineering studies for research into potential in vivo use.

iCell Hepatocytes: ICEL's iCell Hepatocytes, which were available to early access users beginning in 2012, are human liver cells delivered fresh (versus cryopreserved such as other iCell products). Researchers use these cells for pre-clinical drug discovery, toxicity studies, and disease modeling (e.g., virology for Hepatitis C and Hepatitis B strains). Customers also use the cells for regenerative medicine, with a focus on repopulating decellularized livers.

MyCell products: ICEL also manufactures customized cells (MyCell products) for customers with specifications beyond the iCell product line. It began offering this service in June 2012. MyCell products include iPSC lines reprogrammed from customer-sourced samples and derivations from off-the-shelf iCell products. Customers generally purchase MyCell products to explore specific genotypic or phenotypic manifestations of diseases. To date, these include heart failure, Parkinson's disease, hepatotoxicity, and congenital muscular dystrophy.

Media and reprogramming: ICEL has partnered with Life Technologies (MP) to manufacture and distribute its proprietary consumables for reprogramming tissue into iPSCs. These include its medium Essential 8, substrate Vitronectin and episomal iPSC reprogramming vectors. The combination is currently being sold as a kit for research use only (RUO).

***Product pipeline*:** The human body comprises over 200 different cell types—muscle cells, skin cells, nerve cells, and so on—that perform all of its particular functions. ICEL currently only manufactures four cell types, suggesting a long runway for new products. The company currently has seven new products under development including: dopaminergic neurons, nociceptors, astrocytes, cardiac progenitors, blood progenitors, skeletal muscle cells, and current good manufacturing (cGMP) iPSC lines. The following table illustrates ICEL's immediate near-term new product plans.

Cellular Dynamics' Product Pipeline

Product	Product description	Applications
Dopaminergic neurons	Brain cells that express the neurotransmitter dopamine	Dopamine production has been implicated in Parkinson's disease and other neurological disorders. Researchers are interested in how dopamine levels impact these diseases; some researchers believe that implanting pure dopaminergic neurons in Parkinson's patients would have therapeutic benefits.
Nociceptors	Pain receptor neurons	Researchers are interested in understanding how nociceptors work to gain a better understanding of the biology of pain, to quantify it, and to find drugs to modulate it.
Astrocytes	Cells found in the brain that support neuronal function	These cells are synergistic with iCell Neurons. Customers frequently request astrocytes to build a more complete human neurological model. Astroycytes have also been implicated in multiple neurological disorders.
Cardiac progenitors	Cardiac precursor cells that, during human development, become all of the cell types in the human heart	Customers are interested in studying these cells to find compounds that may lead to cardiac repair or for use for therapeutic purposes.
Blood progenitors	Precursor cells for the human blood system	Researchers are interested in studying these cells to find compounds that will help repair the blood system or increase production of blood cells. In addition some researchers are interested in infusing or implanting these cells for therapeutic purposes.
Skeletal muscle cells	Skeletal myocytes are long, tubular cells that form the muscle fibers of the skeletal systems	Pure skeletal myocytes enable better understanding of the biology of various human diseases caused by mutations in genes critical and unique to muscle function (for example, dystrophin gene mutations that cause muscular dystrophy). In addition, the function of these cells is of interest to researchers studying general energy metabolism and metabolic disease.
Current Good Manufacturing Practices (cGMP) iPSC lines	Lines of episomally derived iPSCs manufactured under conditions compatible with full cGMP compliance	Therapeutics manufacturers and others that require cells derived to cGMP standards.

Source: Cellular Dynamics

COMPETITIVE LANDSCAPE

The environment for stem cell research is highly competitive. Many consumers of iPSCs, including biopharma and academic/government institutions, develop these cells in-house. We believe that the greatest competitive threat to Cellular Dynamics's product lines is "home brew" cell lines since most biopharma companies either currently have or at one time had an internal development program. ReproCELL, Univercell-Biosolutions, and Sigma-Aldrich (MP) are perhaps the most direct commercial competitors, while Axiogenesis, Cellectis, General Electric, Life Technologies, and Lonza Group also compete with Cellular Dynamics's iPSC technology.

VALUATION CONSIDERATIONS

Premium Multiple Yet a Discount to a Recent Comparison

ICEL's current enterprise value is ~8x our forward twelve month (FTM) revenue forecast (ex. CIRM). This multiple is currently a two turn premium to the median multiple for its closest comparable group of life science tools and diagnostics peers, which currently trade at ~6x FTM revenue (see following table).

Cellular Dynamics' Peer Group Valuations (dollars in millions, except share price)

					Revenue			EV/Revenue	
Company	**Ticker**	**Stock price**	**Mkt Cap**	**EV**	**2013e**	**2014e**	**Growth**	**2013e**	**2014e**
Luminex	LMNX	$20.67	$855.6	$815.3	$221.7	$246.2	11.0%	3.7x	3.3x
Cepheid	CPHD	34.91	2,354.7	2,266.0	383.3	444.7	16.0%	5.9x	5.1x
Qiagen	QGEN	20.94	4,953.7	5,629.8	1,309.0	1,384.4	5.8%	4.3x	4.1x
GenMark	GNMK	10.19	402.6	402.6	29.3	31.5	7.3%	13.7x	12.8x
Nanosphere	NSPH	2.02	117.0	117.0	10.3	22.4	117.8%	11.4x	5.2x
Sequenom	SQNM	2.98	343.8	343.8	162.0	248.8	53.6%	2.1x	1.4x
Genomic Health	GHDX	31.60	954.9	850.3	260.6	293.8	12.8%	3.3x	2.9x
Fluidigm	FLDM	19.72	501.3	441.3	67.8	82.4	21.6%	6.5x	5.4x
Quidel	QDEL	25.70	866.9	851.2	180.0	202.3	12.4%	4.7x	4.2x
PacBio	PACB	3.65	222.0	222.0	27.1	34.9	29.1%	8.2x	6.4x
ReproCELL	4978-JP	102.62	902.0	902.0	5.1	6.2	23.2%	178.0x	144.5x
Trovagene	TROV	8.81	166.0	166.0	0.9	4.5	400.0%	184.5x	36.9x
Exact Sciences	EXAS	12.16	859.7	859.7	4.1	36.4	786.2%	209.4x	23.6x
NanoString	NSTG	7.35	107.3	107.3	30.4	54.5	79.4%	3.5x	2.0x
Intrexon	XON	$25.8	$2,456.4	$2,456.4	NA	NA	NA	NA	NA
MEDIAN							22%	6.2x	5.2x

Source: Leerink Swann, Bloomberg, FactSet (all estimates are FactSet consensus ex 4978-JP [from Bloomberg]); prices as of 8/15/2013 close

However, ICEL trades at a sharp discount to ReproCELL (4978-JP), the most recent publicly floated stem cell tools company. Our current $15 price target assumes that ICEL's current revenue multiple compresses by ~1x turn, which we believe appropriate to reflect the uncertainty in the company's revenue ramp. Thus, our $15 price target reflects an enterprise value (using projected levels of debt and cash) that is ~7x our revenue estimate (ex CIRM) for the twelve months ended June 2015. We believe it appropriate to exclude the CIRM grant because this is one-time, and thus not something appropriate to apply a multiple. Valued separately, CIRM is perhaps worth ~$0.30 / share.

RISKS TO VALUATION

The primary risks to our price target for ICEL include, but are not limited to: the pace of adoption of its iCell products among biopharmaceutical customers, nature and timing of FDA guidance/regulations, competitive pressures from in-house and commercial producers of iPSC lines, policy decisions, and market extension into therapeutic applications.

MANAGEMENT

Robert J. Palay, Chairman and CEO. Mr. Palay, a founder of the company, has served as Chairman of the Board and as Chief Executive Officer since 2007. Palay previously served as chairman of the board and chief executive officer of each of ICEL's predecessors from their founding until 2008. He also co-founded NimbleGen Systems, Inc., a molecular biology tools company, and served as its chairman of the board from 1999 to 2007 and as its chief executive officer from 1999 to 2000. Since their inception, Palay has served as a manager of the general partner or manager of each of the various Tactics II entities, which are private investment vehicles and are among ICEL's principal shareholders. He received an A.B., magna cum laude, from Harvard College, an M.M. from the J.L. Kellogg Graduate School of Management and a J.D. from the Northwestern University School of Law.

Thomas M. Palay, Vice Chairman and President. Dr. Palay, a founder of the company, has served as Vice Chairman of the Board and as President since 2007. Palay previously served as vice chairman of the board and president of each of ICEL's predecessors from their founding until 2008. He also co-founded NimbleGen Systems, Inc. and served as its vice chairman of the board, vice president and chief operating officer from 1999 to 2007. Since their inception, Palay has served as a manager of the general partner or manager of each of the Tactics II entities. Palay joined the faculty of the University of Wisconsin Law School in 1980. He retired as the Foley & Lardner–Bascom Professor of Law in 2010. Palay received a B.A., summa cum laude, from Tufts University, a J.D. from the University of Pennsylvania and a Ph.D. from the University of Pennsylvania.

Emile F. Nuwaysir, Ph.D, VP of R&D, Manufacturing and Quality Systems and COO. Dr. Nuwaysir has served as Vice President of Research and Development, Manufacturing and Quality Systems and as the Chief Operating Officer since 2008. He is a founder and has served as director of Invenra, a Wisconsin-based early stage company developing technology for biopharmaceutical discovery, since its inception in 2011. He previously served as senior vice president of program management at Roche NimbleGen from 2007 to 2008. Prior to this, he was vice president of business development at NimbleGen Systems, Inc. from 2003 to 2007 and held various scientific and managerial roles at NimbleGen Systems, Inc. from 2000 to 2003, including molecular research and development group leader and senior manager of technical and client services. Prior to NimbleGen Systems, Inc., he held a Postdoctoral Fellowship with the National Institute of Environmental Health Sciences within the National Institutes of Health, a postdoctoral fellowship at the University of North Carolina-Chapel Hill and a research position at EI DuPont de Nemours Stine-Haskell Laboratory. He earned his B.A. from the University of Delaware and his

Ph.D. in Molecular and Environmental Toxicology with a focus in Oncology from the University of Wisconsin-Madison in the McArdle Laboratory for Cancer Research.

Chris Parker, VP and Chief Commercial Officer. Mr. Parker has served as Vice President of Sales, Marketing and Business Development and Chief Commercial Officer since 2008. He previously served as chief commercial officer of Stem Cell Products, Inc. from 2007 to 2009 and as vice president of Affymetrix, Inc. from 1998 to 2007, where he managed sales and marketing for the global pharmaceutical business unit. He also served on the drug discovery services team at Amersham Pharmacia Biotech Inc. and conducted research in molecular and cellular biology in the Department of Human Oncology at the University of Wisconsin-Madison for over a decade. He received a B.A. from the University of Wisconsin–Madison.

Nicholas J. Seay, JD, VP & CTO. Mr. Seay has served as Vice President and Chief Technology Officer since 2007. Representing WARF from 1985 to 2005, Seay successfully established its human embryonic stem cell intellectual property portfolio. Seay has served on the board of directors of Epic Systems Corporation since 1983 and BellBrook Laboratories LLC since 2001. Prior to joining ICEL, from 1989 to 2005, he advised biotechnology companies and worked on significant technologies at Quarles and Brady LLP, specializing in intellectual property law. Seay earned a B.S. from Cornell University and a J.D. from George Washington University Law School.

David S. Snyder, VP & COO. Mr. Snyder has served as Executive Vice President and Chief Financial Officer since 2008. He has served as director of Invenra since 2012. He has also served on the Board of Trustees of Ottawa University since 2012. He previously served as senior vice president of finance, site vice president and chief financial officer of Roche NimbleGen from 2007 to 2008. From 2006 to 2007, he served as vice president and chief financial officer of NimbleGen Systems, Inc. Snyder served as chief financial officer of The Cobalt Group, Inc., a publicly-traded internet software company, from 2000 to 2001, of Strategic Hotel Capital, LLC, a real estate company, from 1997 to 2000. Snyder received a B.A., summa cum laude, from Ottawa University and an MBA with high honors from Harvard Business School, where he was designated a George Fisher Baker Scholar.

Cellular Dynamics (ICEL)

Income Statement

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	2011	Mar-12	Jun-12	Sep-12	Dec-12	2012	Mar-13	Jun-13e	Sep-13e	Dec-13e	2013e	2014e	2015e
Revenue													
Product	**$1,460**	**$643**	**$1,174**	**$1,075**	**$2,286**	**$5,178**	**$1,754**	**$2,100**	**$2,000**	**$3,000**	**$8,854**	**$21,302**	**$36,354**
Collabs, partnerships, other	1,137	503	86	158	657	1,404	636	650	700	2,250	4,236	11,800	20,200
Total revenue	2,597	1,146	1,260	1,233	2,943	6,582	2,390	2,750	2,700	5,250	13,090	33,102	56,554
COGS	727	143	418	287	1,241	2,089	577	798	760	1,140	3,275	7,669	12,724
Gross profit	1,870	1,003	842	946	1,702	4,493	1,813	1,952	1,940	4,110	9,815	25,433	43,830
SG&A	9,513	2,733	3,251	2,888	3,550	12,422	3,636	4,000	4,500	5,500	17,636	19,861	31,104
R&D	13,660	3,058	3,765	3,529	3,949	14,301	3,856	4,000	4,500	6,250	18,606	24,826	28,277
Operating income (loss)	**(21,303)**	**(4,788)**	**(6,174)**	**(5,471)**	**(5,797)**	**(22,230)**	**(5,679)**	**(6,048)**	**(7,060)**	**(7,640)**	**(26,427)**	**(19,254)**	**(15,551)**
Interest expense (income)	44	10	9	8	7	34	7	144	268	258	678	1,074	1,130
Other expense, net	(3)	(1)	0	0	1	0	0	0	0	0	0	0	0
Pretax income	(21,344)	(4,797)	(6,183)	(5,479)	(5,805)	(22,264)	(5,686)	(6,192)	(7,328)	(7,898)	(27,105)	(20,329)	(16,681)
Taxes	0	0	0	0	0	0	0	0	0	0	0	0	0
Net income	($21,344)	($4,797)	($6,183)	($5,479)	($5,805)	($22,264)	($5,686)	($6,192)	($7,328)	($7,898)	($27,105)	($20,329)	($16,681)
Basic shares outstanding	16,688					16,839	11,877	11,877	16,300	16,300	14,088	16,300	16,300
Diluted shares outstanding	16,688					16,839	11,877	11,877	16,300	16,300	14,088	16,300	16,300
EPS diluted	**($1.28)**					**($1.32)**	**($0.48)**	**($0.52)**	**($0.45)**	**($0.48)**	**($1.92)**	**($1.25)**	**($1.02)**
EPS growth													
Sales growth		92.3%	106.2%	159.6%	221.6%	153.4%	108.6%	118.3%	119.0%	78.4%	98.9%	152.9%	70.8%
Product gross margin	50.2%	77.8%	64.4%	73.3%	45.7%	59.7%	67.1%	62.0%	62.0%	62.0%	63.0%	64.0%	65.0%
SG&A % of revenue	366.3%	238.5%	258.0%	234.2%	120.6%	188.7%	152.1%	145.5%	166.7%	104.8%	134.7%	60.0%	55.0%
R&D % of revenue	526.0%	266.8%	298.8%	286.2%	134.2%	217.3%	161.3%	145.5%	166.7%	119.0%	142.1%	75.0%	50.0%
Operating margin	**(820.3%)**	**(417.8%)**	**(490.0%)**	**(443.7%)**	**(197.0%)**	**(337.7%)**	**(237.6%)**	**(219.9%)**	**(261.5%)**	**(145.5%)**	**(201.9%)**	**(58.2%)**	**(27.5%)**
Tax rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
D&A	$1,366	$405				$1,433	$341				$1,638	$2,707	$3,642
EBITDA	**($19,937)**	**($4,383)**				**($20,797)**	**($5,338)**				**($24,789)**	**($16,547)**	**($11,910)**
Free cash flow													
Operarating cash flow	($19,232)	($4,965)				($21,004)	($4,829)				($25,720)	($18,193)	($13,190)
CapX	(558)	(29)				(132)	(120)				(4,383)	(4,497)	(7,408)
Free cash flow	($19,790)	($4,994)				($21,136)	($4,949)				($30,103)	($22,690)	($20,598)
Guidance													
Total revenue													

Notes:

Source: Company reports and Leerink Swann estimates

Cellular Dynamics (ICEL)

Balance Sheet *($ thousands)*	Mar-12	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13e	Sep-13e	Dec-13e
Assets								
Cash, equivalents, and short-term investments	$31,692	$26,338	$20,271	$33,900	$28,488	$33,897	$75,527	$65,459
Accounts receivable	817	1,040	1,161	2,658	1,898	2,071	1,425	2,137
Inventory	2,939	2,765	3,157	2,381	2,483	3,061	2,915	4,373
Other	415	480	489	662	1,544	1,008	960	1,440
Total current assets	35,863	30,623	25,078	39,601	34,413	40,037	80,826	73,408
Property and equipment, net	1,535	1,314	1,105	873	777	1,222	2,038	4,118
Goodwill	6,817	6,817	6,817	6,817	6,817	6,817	6,817	6,817
Other intangibles	2,069	2,337	4,177	4,195	4,270	4,145	4,020	3,895
Other	10	10	10	10	10	10	10	10
Total assets	$46,294	$41,101	$37,187	$51,496	$46,287	$52,231	$93,711	$88,248
Liabilities and shareholders' equity								
Notes payable and current maturities of long-term de	$434	$387	$385	$336	$338	$605	$605	$605
Accounts payable	764	1,161	2,981	1,035	1,754	2,714	370	1,566
Accruals and other	1,575	1,938	1,499	2,400	2,049	1,848	1,760	2,640
Total current liabilities	2,773	3,486	4,865	3,771	4,141	5,167	2,735	4,811
Long-term debt	973	894	814	734	636	11,494	11,494	11,494
Other	0	0	0	0	0	0	0	0
Total liabilities	$3,746	$4,380	$5,679	$4,505	$4,777	$16,661	$14,229	$16,305
Shareholders' equity	$42,548	$36,721	$31,508	$46,991	$41,510	$35,570	$79,482	$71,943
Total liabilities, shareholders' equity, and minority inter	$46,294	$41,101	$37,187	$51,496	$46,287	$52,231	$93,711	$88,248

Notes:
Source: Company reports and Leerink Swann estimates

Disclosures Appendix

Analyst Certification

I, Dan Leonard, certify that the views expressed in this report accurately reflect my views and that no part of my compensation was, is, or will be directly related to the specific recommendation or views contained in this report.

Distribution of Ratings/Investment Banking Services (IB) as of 06/30/13				
			IB Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
BUY [OP]	103	62.80	30	29.00
HOLD [MP]	61	37.20	2	3.00
SELL [UP]	0	0.00	0	0.00

Explanation of Ratings

Outperform (Buy): **We expect this stock to outperform its benchmark over the next 12 months.**

Market Perform (Hold/Neutral): **We expect this stock to perform in line with its benchmark over the next 12 months.**

Underperform (Sell): **We expect this stock to underperform its benchmark over the next 12 months.The degree of outperformance or underperformance required to warrant an Outperform or an Underperform rating should be commensurate with the risk profile of the company.**

For the purposes of these definitions the relevant benchmark will be the S&P 600® Health Care Index for issuers with a market capitalization of less than $2 billion and the S&P 500® Health Care Index for issuers with a market capitalization over $2 billion.

Important Disclosures

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