# Circadian Technologies Limited (ASX:CIR, OTCQX:CKDXY)

# Biopartnering Europe

October 10, 2011



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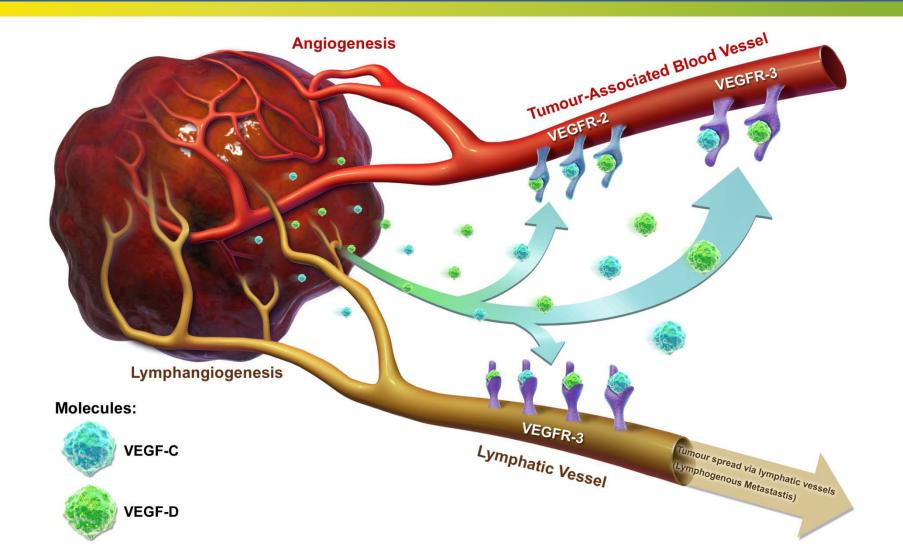
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- Major IP Platform covering VEGF-C, VEGF-D and VEGFR-3
- Developing unique antibody therapies VGX-100
  - > As combination therapy in chemotherapy (P1 to commence Q4 '11)
  - ➤ As monotherapy in front of eye disease (P1 to commence Q4 '12/Q1 '13)
  - ➤ IMC-3C5 being developed by Eli Lilly/Imclone (P1 commenced Apr 11)
- Developing Diagnostics as early stage revenue source
  - > From Platform
    - VEGF-D in respiratory disease and treatment monitoring
    - VEGF-C in oncology and monitoring Avastin therapy
  - Cancers of Unknown Primary partnered with Healthscope
- Additional Revenue generating partnerships
  - ➤ Ark Therapeutics VEGF-D gene therapy
  - ➤ R&D Systems Inc, Merck Millipore, Perkin Elmer Research reagents

# Our antibodies are targeted to block angiogenesis AND lymphangiogenesis to treat cancer and eye disease

- Novel Vascular Endothelial Growth Factors (VEGF-C) antibody therapy based on tumor starvation and metastasis inhibition
- Anti-VEGF therapy has gained wide acceptance on the strength of Genentech/Roche Avastin® with 2010 US Sales of \$7.2 billion
- A major opportunity to be used in combination with Avastin® and/or other anti-angiogenic therapies to improve patient outcomes in oncology
- Significant potential as monotherapy in front of the eye disease.

# Mechanism of Circadian's Drugs: VGX-100 inhibits VEGF-C



## Our Lead Internal Therapeutics program: VGX-100

- Fully human neutralizing monoclonal antibody for VEGF-C
  - Pre-clinical data demonstrating anti-tumourigenic and anti-metastatic effects in animal models of human prostate, pancreatic, brain, lung and ovarian cancers presented at AACR
  - VEGF-C shown to be potential predictive biomarker of Avastin® resistance in Colorectal cancer – ASCO 2011
  - IND Filed September 30 2011
  - Phase 1 multi-dose ascending trials to commence Q4 in cancer patients
  - Glioblastoma and mCRC first indications
    - Also Expanding development to also include treatment of front-of-eyediseases

# Partnered programs with existing and increasing royalty streams

**Therapeutics:** VEGFR-3 antibody (IMC-3C5) for solid tumours

- Development agreement with ImClone/Eli Lilly
- > FDA Phase I trial started April 2011
- > Annual Fees, Royalty on Sales

#### Cancer Diagnostics: Cancer of Unknown Primaries (CUP)

- Development partnership with Healthscope
- Launch in Asia expected H1 2012

#### **Platform Diagnostics**: VEGF-D diagnostic for respiratory diseases

- Development partnership with Cincinnati Children's Hospital Medical Center;
- Launched Feb 11

# Dominant and protected IP position extending till at least 2025

- ➤ Acquired from Ludwig Institute/Uni Helsinki
- ➤ Exclusive worldwide licences for VEGF-C –HGS/Cogenesys/Teva
- Exclusive worldwide licences for VEGF-D Chugai (Jan 2011)

## **Strong financial position**

- Approx \$A22M cash and investments
- Cash Burn 2011/12 (est) \$10-12.5M

# VGX-100 VEGF-C Inhibition: Rationale



Our approach is based on the widely accepted view that combination targeted therapies is the way of the future in oncology

Since most tumors eventually find a way to get around blocked pathways,

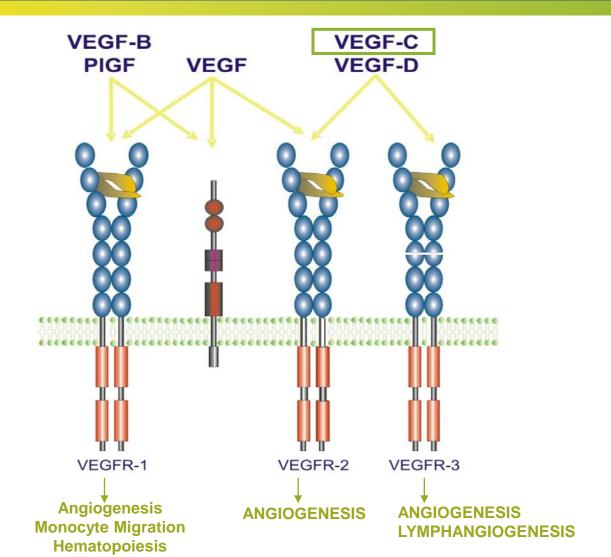
"there is widespread understanding that we are going to need to learn how to combine two or more targeted therapies to block the main road and the side road and the dirt road..."

ASCO Chief Executive Dr. Allen Lichter, ASCO Annual meeting June 2011.

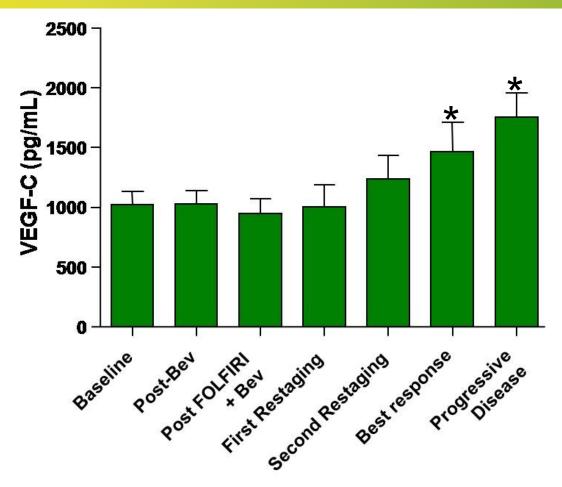
### VEGF-C IN AVASTIN® 'ESCAPE'

- Avastin®: Effective but not in all patients
  - Not all patients respond to therapy (30-50% response rate)
  - 25-50% of responders become "resistant" within 12 to 18 months
  - Likely reasons:
    - Tumor growth due to factors other than VEGF; and/or
    - Other angiogenic factors being turned on when VEGF blocked (eg. VEGF-C)
- VEGF-C is a likely candidate mediating the tumoral growth 'escape' in anti-VEGF -resistant tumors.
- Upregulation of VEGF-C could maintain signalling through VEGFR-2, despite VEGF inhibition.

# VEGF-C is a member of the VEGF family that binds VEGFR-2 and VEGFR-3



# Circulating VEGF-C levels are elevated in Avastin®/FOLFIRI treated patients prior to disease progression

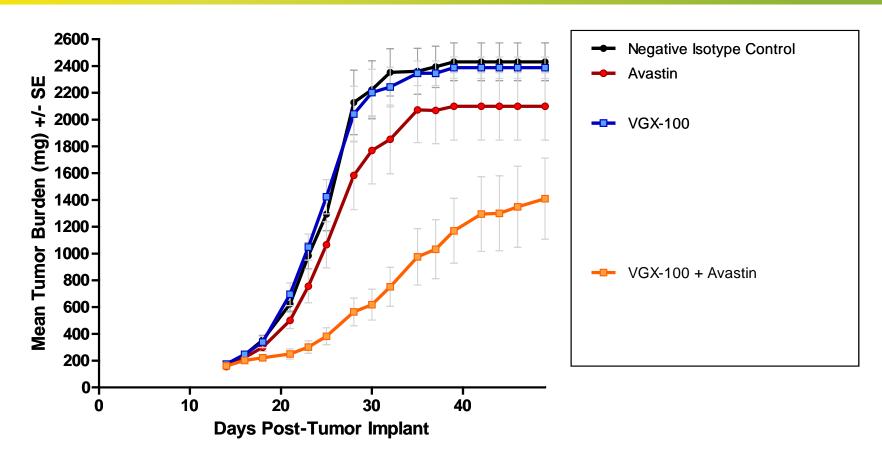


Plasma VEGF-C may be a predictive biomarker for the development of resistance to Bevacizumab

# VGX-100 Efficacy in Mouse Models of Human Cancer



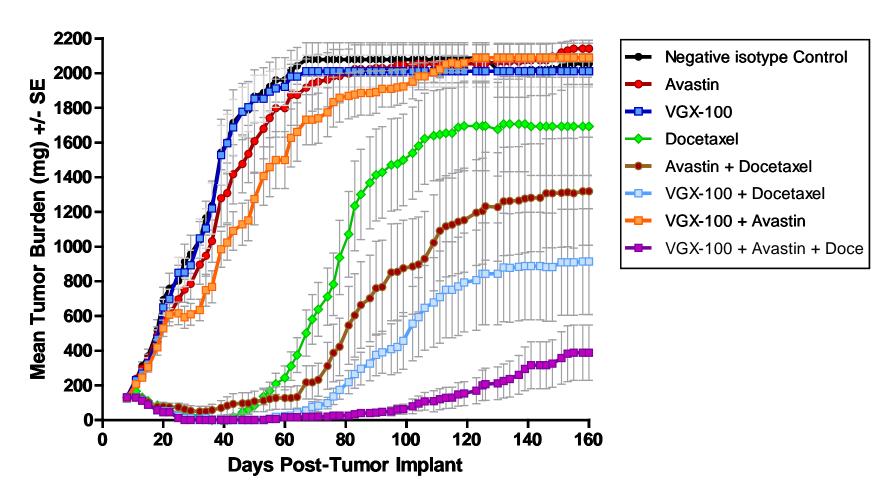
# U87MG Glioblastoma Tumor Xenografts: VGX-100 effective in combination with Avastin



At Day 49, VGX-100 + Avastin reduces tumor burden by:

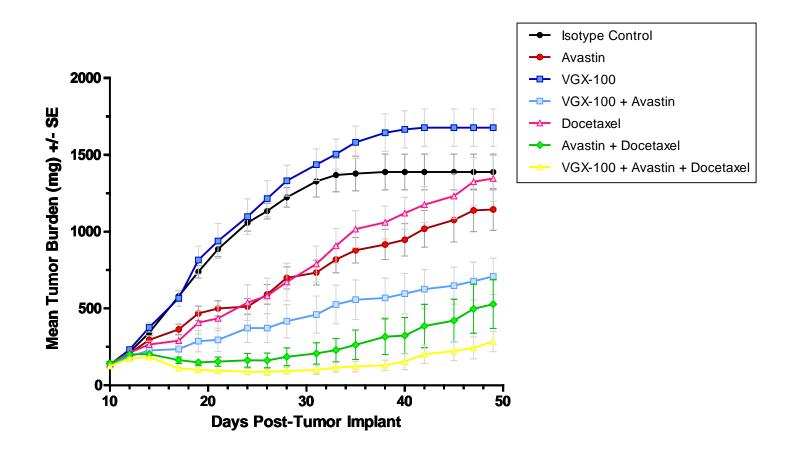
- 42% compared to control IgG
- 33% compared to single-agent Avastin.

# VGX-100 single-agent & combination therapy in PC-3 prostate cancer xenografts



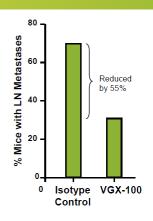
Docetaxel: Weekly IV at 10 mg/kg for 3 weeks. Vehicle: 10% EtOH, 10% Tween 20, 80% water.

# H292 NSCLC Tumor Xenografts: VGX-100 effective in combination with Avastin

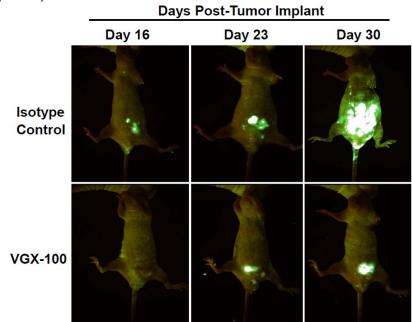


# VGX-100 reduces metastasis in an orthotopic prostate cancer model

Group	# Mice	# Mice with LN Mets	% Mice with LN Mets	p value*
Isotype Antibody Control	17	12	71%	,
VGX-100	19	6	32%	0.019



<sup>\*</sup> p value by Fisher exact test.



# VGX-100 ONCOLOGY CLINICAL DEVELOPMENT



# VGX-100 Target Product Profile in Oncology

#### Indication:

- Co-administered with anti-angiogenic agent eg (Avastin®) and standard of care
  - » Targeting glioblastoma, colorectal cancer
  - » At least one of breast, lung, renal and/or potentially ovarian cancer in combination with Avastin®

#### Optimal timing of treatment:

- First line with SOC and anti-angiogenic agent
- In the treatment of selected Avastin® resistant patients plus SOC

### Glioblastoma

- In the US in 2010<sup>1</sup>
  - Estimated diagnosed: 22,020
  - Estimated fatalities: 13,140
- The most aggressive malignant primary brain tumor in adults
- Nearly always fatal
- Possibility for fast track registration based on increased PFS, OS in Phase 2b study when compared to Avastin alone
- Very strong interest from Key Opinion leaders worldwide

<sup>&</sup>lt;sup>1</sup>Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2008, National Cancer Institute. seer.cancer.gov/csr/1975\_2008/ based on November 2010 SEER data submission, posted to the SEER web site, 2011.

# Avastin® Registrational Study in Glioblastoma

VOLUME 27 · NUMBER 28 · OCTOBER 1 2009

#### JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

# Bevacizumab Alone and in Combination With Irinotecan in Recurrent Glioblastoma

Henry S. Friedman, Michael D. Prados, Patrick Y. Wen, Tom Mikkelsen, David Schiff, Lauren E. Abrey, W.K. Alfred Yung, Nina Paleologos, Martin K. Nicholas, Randy Jensen, James Vredenburgh, Jane Huang, Maoxia Zheng, and Timothy Cloughesy

#### ABSTRACT

#### **Purpose**

We evaluated the efficacy of bevacizumab, alone and in combination with irinotecan, in patients with recurrent glioblastoma in a phase II, multicenter, open-label, noncomparative trial.

#### **Patients and Methods**

One hundred sixty-seven patients were randomly assigned to receive bevacizumab 10 mg/kg alone or in combination with irinotecan 340 mg/m<sup>2</sup> or 125 mg/m<sup>2</sup> (with or without concomitant enzyme-inducing antiepileptic drugs, respectively) once every 2 weeks. Primary end points were 6-month progression-free survival and objective response rate, as determined by independent radiology review. Secondary end points included safety and overall survival.

#### Results

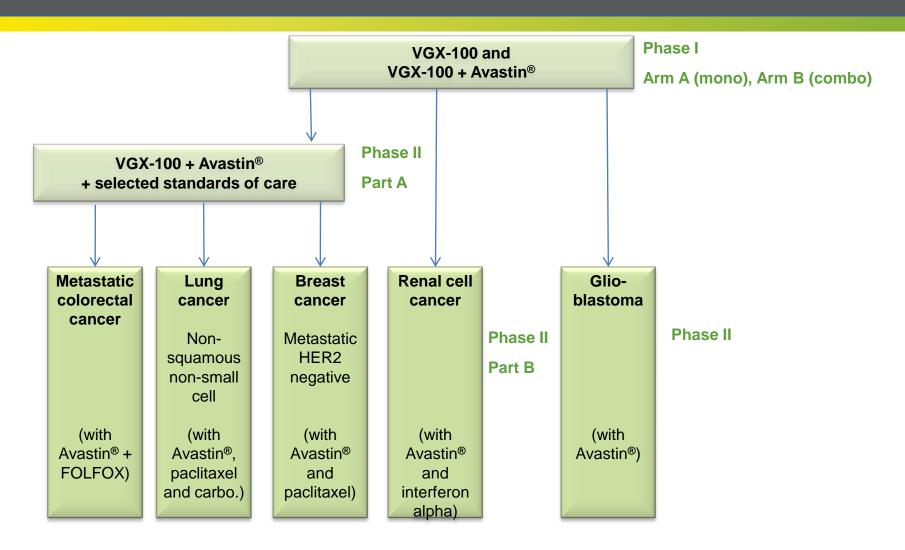
In the bevacizumab-alone and the bevacizumab-plus-irinotecan groups, estimated 6-month progression-free survival rates were 42.6% and 50.3%, respectively; objective response rates were 28.2% and 37.8%, respectively; and median overall survival times were 9.2 months and 8.7 months, respectively. There was a trend for patients who were taking corticosteroids at baseline to take stable or decreasing doses over time. Of the patients treated with bevacizumab alone or

University, Durham, NC; Department of Neurosurgery, University of California, San Francisco, San Francisco; Genetech Inc. South San Francisco: and Department of Neurology, University of California, Los Angeles School of Medicine, Los Angeles, CA; Department of Neurology, Brigham and Women's Hospital and Center for Neuro-Oncology, Dana-Farber Cancer Institute, Boston, MA; Hermelin Brain Tumor Center, Henry Ford Hospital, Detroit, MI; Department of Neurology, University of Virginia, Charlottesville, VA; Department of Neurology, Memorial Sloan-Kettering Cancer Center, New York, NY; Department of Neuro-Oncology, M. D. Anderson Cancer Center, Houston, TX; Division of Neurology, Evanston Northwestern Healthcare,

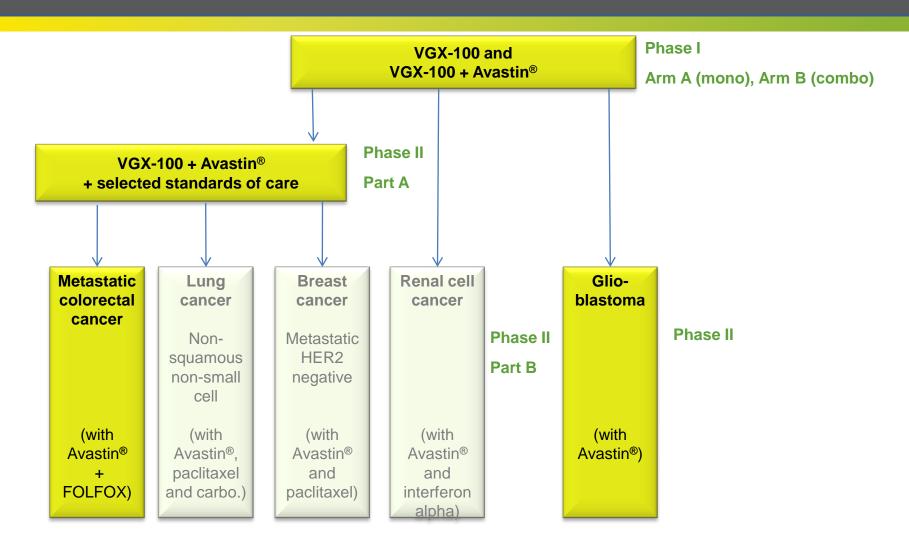
Evanston, IL: Department of Neurology.

From the Brain Tumor Center, Duke

## Phase I and II clinical program



## Phase I and II clinical program



# VGX-100 OCULAR DEVELOPMENT OPPORTUNITY



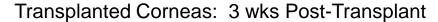
## **Development Opportunity**

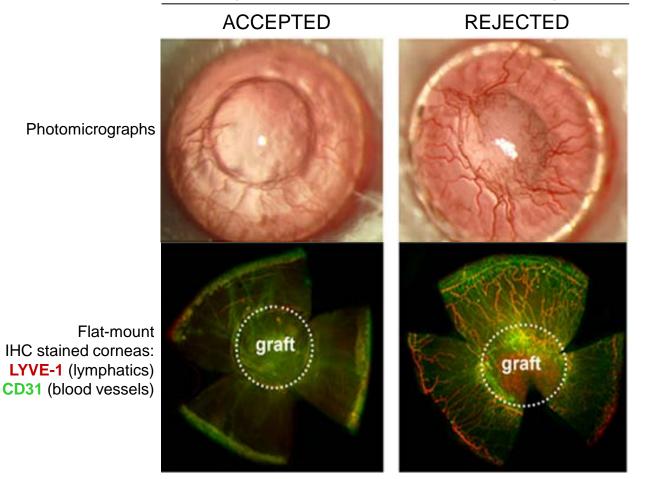
- Significant development opportunity for VGX-100 as a treatment for 'front of the eye' disease.
- Initial indications:
  - Corneal Neovascularisation (CNV)
    - Estimated that up to 4-5% of patients at eye clinics have CNV
  - High-Risk Corneal Allograft Rejection
    - >10000 grafts/yr in USA
  - Dry Eye Disease
    - Affects 5M people over 50 yrs in USA
    - 1 drug "Restasis" sells >\$1B/yr worldwide
    - Preclinical POC data to be published Sept '11.
- Local ocular administration via subconjunctival injection as a single-agent.
- Approx. 12 18 months to Phase I/II

# Existing & Supportive Preclinical Data:

VGX-100 improves Corneal Transplant Survival

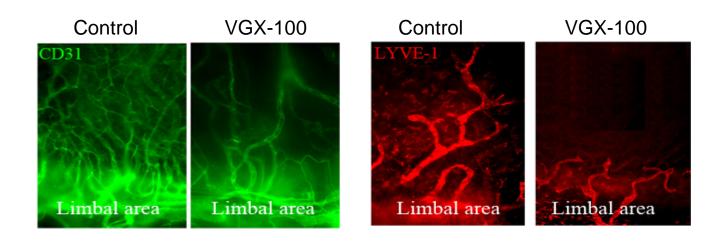
# Rejected corneas are infiltrated by blood and lymphatic vessels and over-express VEGF-C and VEGFR-3

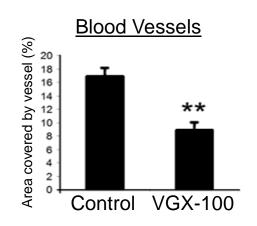


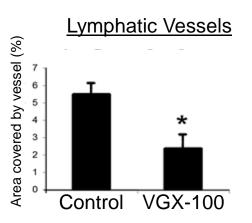


VEGF-C expression increased 2-fold in rejected vs accepted allografts, and 4.8 fold over non-transplanted corneas.

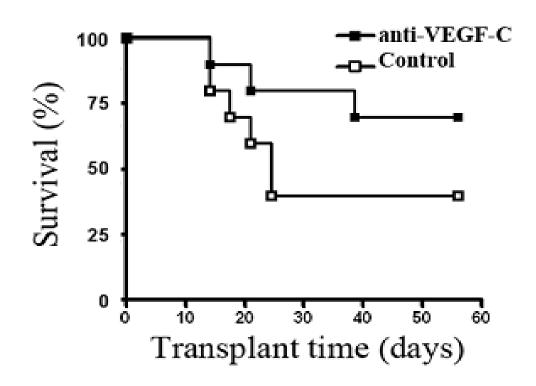
# VGX-100 reduces blood and lymphatic vessel density in transplanted corneas







# VGX-100 Promotes Corneal Transplant Survival



# Corporate Details



## STATUS AND UPCOMING VALUE ADDING EVENTS

Activity	Timeline
VGX-100 First-in-human cancer patients Clinical Study	Q4 2011
(monotherapy)	
CUP Test Launch	Q1 2012
VGX-100 First-in-human cancer patients Clinical Study	H2 2012
(Combination with Avastin/Chemotherapy)	
VGX-100 Phase 1 trials complete	Q4 2012
IMC-3C5 Phase 1 trials reported	H1 2013
VGX-100 Phase II studies in cancer patients start (Multiple Indications)	Q1 2013
VGX-100 IND Filing Front of Eye Disease	H2 2013
Clinical proof-of-concept in cancer	2H 2014 32

## A strong financial position & shareholder base

#### Top 10 shareholders: 55.6%

Investor	% of i	ssued
	S	hares
Packer and Co Limited		16.66
Licentia Ltd		6.79
Ludwig Institute for Cancer		6.73
Research		
Select Asset Management		5.10
Leon Serry		4.53
HSBC Custody Nominees		3.45
(GSCo) (NY Fund)		
Chemical Trustee Limited		3.36
&assoc		
HSBC Custody Nominees (NY		2.70
Fund)		
National Nominees		2.30
Citigroup Nominees		2.23
JFF Steven Pty Ltd		1.76
Total 10 shareholders own	55.6%	_
Total 20 shareholders own	63.0%	

# Financial Summary @ 7 October 2011 (unaudited)

Stock code:	CIR	
Share price:	50c (AUD)	
Shares issued + deferred issue:	46,396,928	
Market cap:	~ A\$23 mill	
Cash holdings: Listed investments: (ASX: ANP, OIL)	~ A\$20 mill A\$2.0M	

#### **Cash Burn estimate 2011/12 \$10-12m**

Institutions/Funds: ~ 43%

Retail investors: ~ 30%

Professional investors: ~ 27%

## Key Reasons to Invest

### Clinical Stage Assets

- One product in the clinic IMC-3C5 being developed by Eli Lilly
- VGX-100 by Q4 2011 in oncology
- VGX-100 by Q1 2013 in eye disease
- Major value adding clinical data from Q3 2012

# Increasing Diagnostics Portfolio generating revenues

- VEGF-D diagnostic on the market for LAM in USA; other territories next 6-12 months
- CUP test likely launch by Healthscope Q4 2011
- VEGF-C and VEGF-D diagnostics in cancer in development

## Key Reasons to Invest

- A platform with major deal/partnering potential across a range of products over next 3-18 months
  - VGX-100 in oncology
  - VGX-100 in eye disease
  - VEGF-C diagnostics in oncology (Avastin responders)
  - VEGF-D diagnostics in oncology
  - VEGF-C/D proteins in wound healing, cardiac disease, bone disease
- Investments coming up to major re-rating events
  - ANP ATL1103 clinical data in Q4 2011
  - OIL culmination of "strategic review" in Q4 2011

## Key Reasons to Invest

## Re-rating of Value imminent

- Trades at cash backing
- Historical valuation based on LIC history
- Significant mispricing compared to comparables in USA, Europe and Australia
- Drivers: clinical trial commencement and/or partnerships

## Capability to get to key value adding events

- Approx \$22M in cash and investments
- Superb internal and external drug development teams

## **Thank You**

www.circadian.com.au

# Appendix

# Clinical Appearance of CNV in Inflammatory Disorders



**CNV** in Salzmann's nodular degeneration

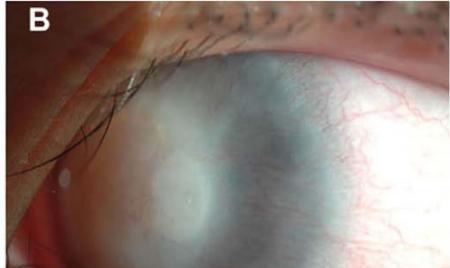


**CNV** due to Rosacea

### CNV and Inflammation Associated with LSCD

Ellenberg et al., Prog.Retinal & Eye Research, 29:208-248, 2010.





**CNV** due to Limbal Stem Cell Deficiency

CNV can be diagnosed & monitored using routine procedures:

- Ocular examination
- Corneal fluorescein staining & slit-lamp
- Quantitation of vascularised corneal area, depth and stromal involvement

### Preliminary Market Opportunity Assessment

### **CNV** associated with Ocular Herpes Simplex Infection:

Incidence of New & Recurring Herpetic Keratitis Cases/Year (U.S.A.): 50,000					
Annual Cost per Patient/Year (U.S.A.)	Estimated Annual Revenue (U.S.A.)				
• USD 5,000	USD 250M				
• USD 10,000	USD 500M				
• USD 15,000	USD 750M				

## Preliminary Market Opportunity Assessment

### **Corneal Allograft Rejection:**

# Corneal Transplants/Year	(U.S.A): 40000		
# High-Risk Corneal Transpla	ants/Year (U.S.A): 10000		
Annual Cost per	Estimated Annual Revenue		
Patient/Year (U.S.A)	(U.S.A.)*		
• USD 5000	USD 50M		
• USD 10000	USD 100M		
• USD 15000	USD 150M		

# Comparables

- Market Cap Comparable
  - Bioinvent, (Nasdaq OMX Stockholm: BINV SS), has been trading with a market cap in the range of \$275 million
  - 4 products in either FDA Phase I or II trials including TB-403
  - TB-403, at Phase I, is a humanized monoclonal antibody developed to treat solid tumours in combination with Avastin and chemotherapy
- Licensing Comparable
  - Astellas Pharma's \$1.3 billion milestone licensing agreement with Aveo Pharmaceutical for a FDA Stage III VEGF antibody for renal cancer
  - Bioinvent/Roche Deal on PLGF Ab
- Acquisition Comparable
  - Arius Research, a Canadian development stage antibody company, bought by Roche in July 2008 for \$189 million
  - Portfolio of pre-clinical stage antibody candidates

# Competitive Landscape

Р3

P3

P2

P2

P2

P1

P1

Ρ1

2<sup>nd</sup> line NSCLC

cancer

Wet AMD

Breast, HCC

Glioblastoma

Glioblastoma

Glioblastoma

**Solid Tumours** 

**Solid Tumours** 

Ovarian

1<sup>st</sup> line hormone

resistant prostate

to Avastin, NOT as

eye" disease

to Avastin, NOT as complementary agent

Target outside VEGF

Target outside VEGF

Avastin

Avastin

Likely to be combined with

Likely to be combined with

45

complementary agent

CIR agents not for "back of

Positioned as direct competitor

Target outside VEGF pathway

Being combined with Avastin

BIOLOGICAL ANTI-ANGIOGENIC AGENTS									
Company	Molecule	Target	Partner & Partnering Stage	Clinical Stage	Indication	Relevance To CIR			
Regeneron	Aflibercept	VEGF-A	Sanofi	Р3	1 <sup>st</sup> and 2 <sup>nd</sup> line CRC	Positioned as direct competitor			

Phase 1

Bayer

Phase1

Eli Lilly

Phase 1

N/A

Roche

None

None

None

Pre-clinical

Pre-clinical

Merck (terminated)

(VEGF Trap)

Aflibercept

IMC-1121b

CVX-060

TB-403

AV-299

TRC-105

MNRP-1685

MEGF-0444

Regeneron

**Imclone** 

Pfizer

**AVEO** 

Tracon

Genentech

Genentech

Bioinvent

**PIGF** 

**VEGF-A** 

VEGFR-2

PIGF

Ang-2

**PIGF** 

HGF

Endoglin

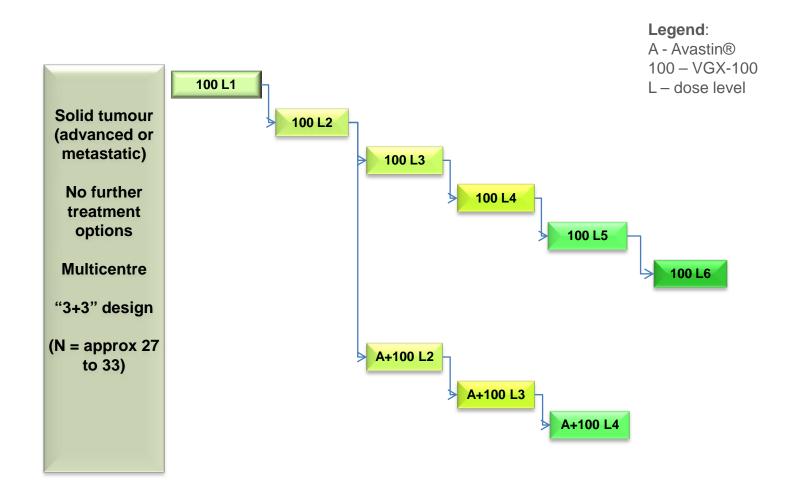
EGFFL7

Neuropilin-1

## Dominant and protected IP position

- Granted IP rights in major territories to VEGF-C/D proteins and VEGFR-3 and blockers
- Freedom to operate through deals with HGS and Chugai
- IP rights over product candidates extend beyond September 2023
- Further strategic IP filings being made to extend patent life
- Over 500 granted and pending patents worldwide
- Protection through US and European market exclusivity provisions

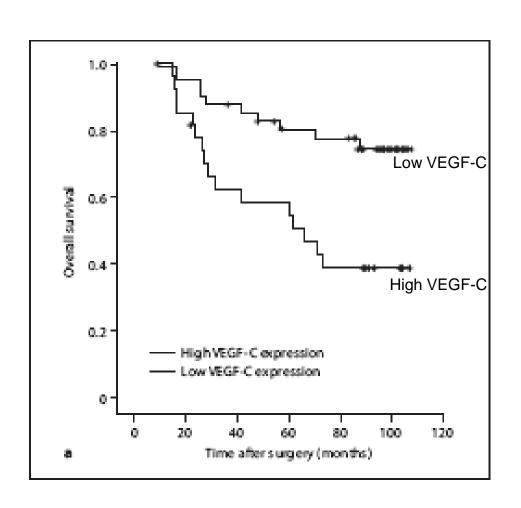
## Phase I First-in-Human Study



# VEGF-C –well recognised survival prognostic factor in a number of tumour types

One example

### VEGF-C is a risk factor for colorectal cancer



#### **69 CRC**

#### **VEGF-C** correlated with:

- LN Metastases
- Clinical Stage

# Elevated VEGF-C associated with:

- Decreased DFS
- Decreased OS