Phylogica

Harnessing biodiversity for biologics discovery

September 2010

Introduction

- Drug discovery and screening company based in Perth, Western Australia
- Proprietary peptide libraries encoded from biodiverse bacterial genomes
- Accessing stable peptide structures from bacteria living in extreme environments
- Hybrid business model combines fee-for-service with in-house drug discovery
- Initiated commercialization – signed deal with Roche in December 2009
- Signed another deal with MedImmune/AstraZeneca in August 2010
- Discussions with multiple big pharma – aiming for one additional deal in 2010
- Opportunity for second deal with Roche (already negotiated)
- International management team with pharma and biotech experience

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Financial overview

- Listed on Australian stock Exchange (ASX:PYC) and Frankfurt (XETRA: PH7)
  - 235.7M Ordinary shares, 22.7M Options
  - 1,340,000 convertible notes (which can convert to 26.8M shares)
  - Market capitalization of ~AU$15M
- Backed by Australia's leading life science investors
  - Largest shareholder is Biotech Capital Limited (managed by Titan Bioventures)
  - Top 12 shareholders hold more than 50%
- Focused control of operating costs
  - Operating costs of ~AU$4.5M
- Strategy to maximize near-term revenue
  - Objective to achieve cash sustainability in 2011-2012

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Experienced Executive Team

Dr Douglas Wilson - *Executive Chairman*

- Former Senior Vice-President, Medicine for Boehringer Ingelheim
- Overseen multiple drugs at all phases of development including bringing many drugs successfully to the market in the USA

Dr Paul Watt – *CEO*

- Commonwealth overseas scholarship recipient
- Doctorate at the University of Oxford,
- More than 40 publications, including several high-impact and well-cited papers
- Post Doctoral appointments at Oxford and Harvard Universities
- Over 10 years commercial biotech experience
- Inventor on 19 patent families, including multiple issued in US/Europe

Mr Nick Woolf – *Director*

- 18 years experience in biotech industry, equity research & investment banking
- Currently Chief Business Officer of Oxford BioMedica plc in the UK
- Former Head of European Biotech Equity Research at ABN Amro
- Extensive knowledge of international capital markets and investor relations
- Qualified accountant and MA in Chemistry from the University of Oxford

Experienced Board

Mr Harry Karelis – *Deputy Chairman*

- Established major Australian life sciences fund, BioTech Capital Ltd
- Board member of several private and public life sciences companies
- Experience in financial analysis, fund management in Australia and overseas

Mr Bruce McHarrie – *Non-Executive Director*

- Over 14 years of biotechnology experience
- Director of Finance and Business Development at Telethon Institute for Child Health Research, Western Australia
- Former Assistant Director, Bioscience Unit at Rothschild Asset Management, UK

Lower Risk Business Model

Contract Drug Discovery for Pharma with In-House discovery

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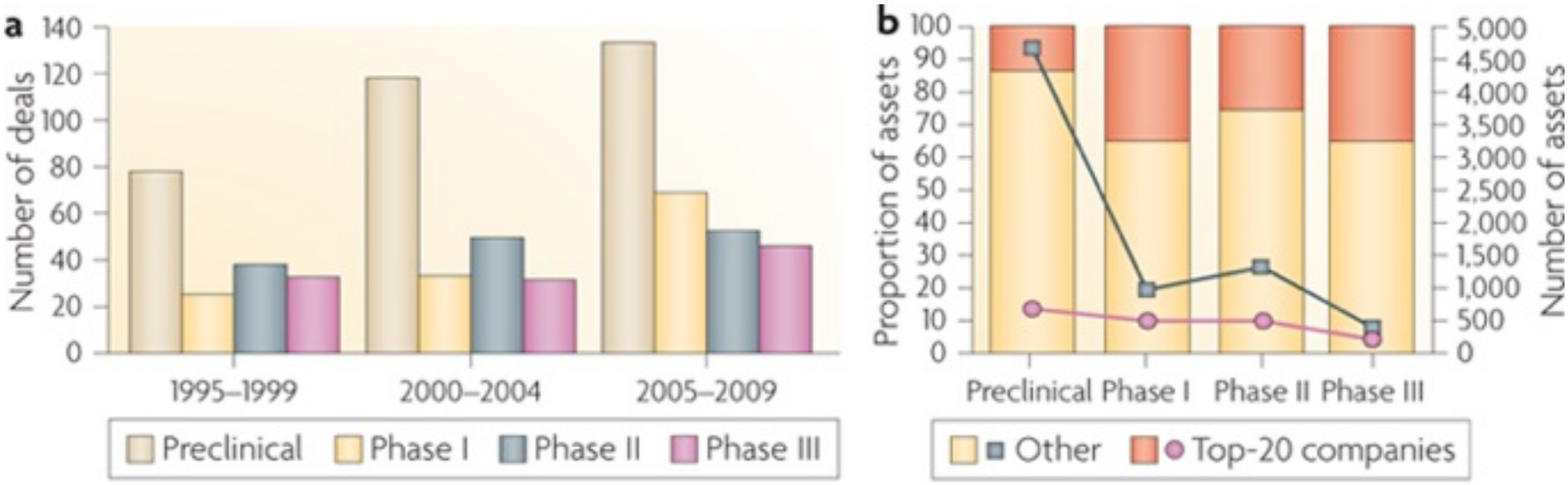
Big Pharma are increasingly outsourcing drug discovery



Nature Reviews | Drug Discovery
Volume 9, March 2010, p183

Discovery Partnerships: a marriage made in heaven

Small Biotech

- Cash poor
- Nimble
- Innovative
- Poor at clinical trials
- Poor at production/scale-up
- Poor at marketing/distribution

Big Pharma

- Cash rich
- Slow Moving
- Conservative
- Clinical trial experts
- Strong production/scale-up
- Strong at marketing/distribution

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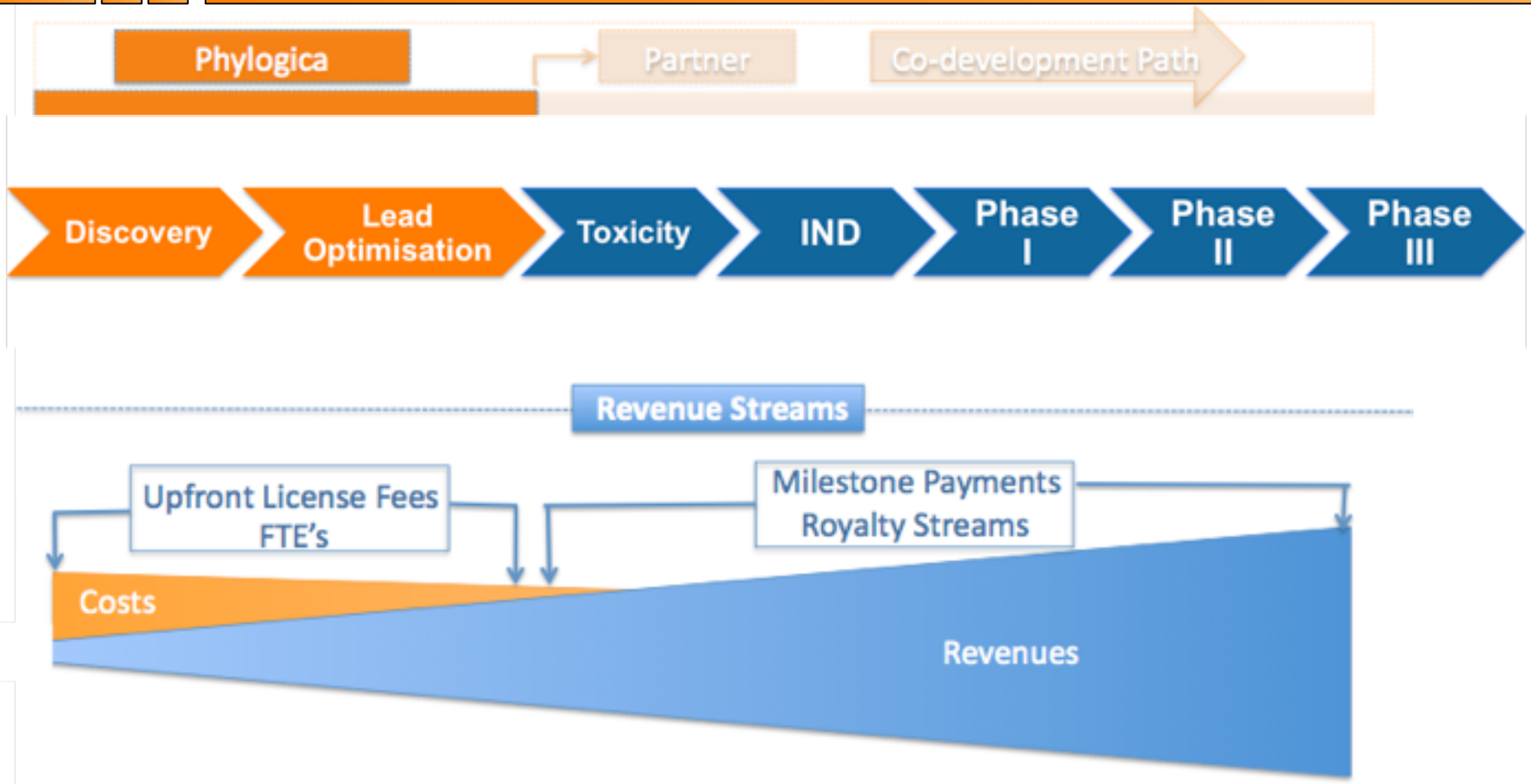
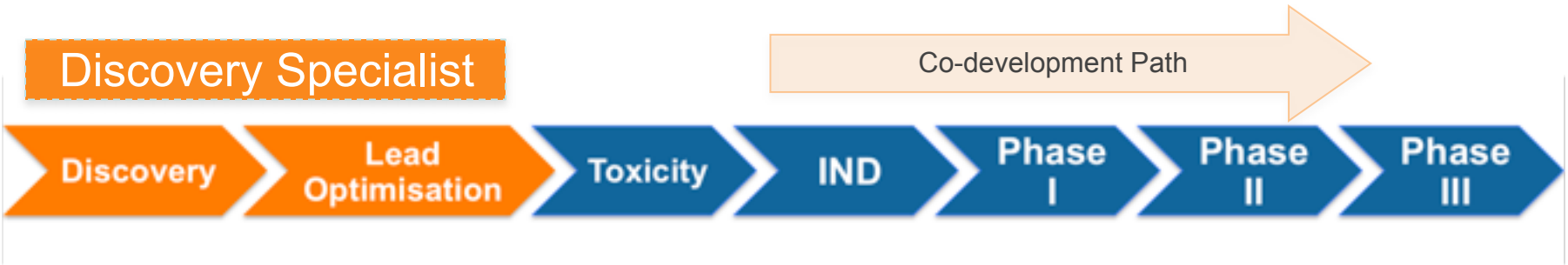
Access to long-term revenue streams



Build long-term value through milestones and royalties

- Secure increasing share of down-stream value through co-development, funded by surplus cash flow

Maximize near-term revenue



- **Near-term revenue from fee-for-service drug discovery and screening**
- Screening peptide libraries against third-party drug targets
- No investment in each screening project required before initiation
- Converting hits to leads and full optimization of drug candidates

Discovery Pharma Partnerships	
	Value Per Drug Target (US$)
Upfront license fee	five to seven figures
Contract Discovery (several FTE's funded/year)	six to seven figures
Cumulative Milestone Payments	Up to $100M
Royalties	usually single digit %

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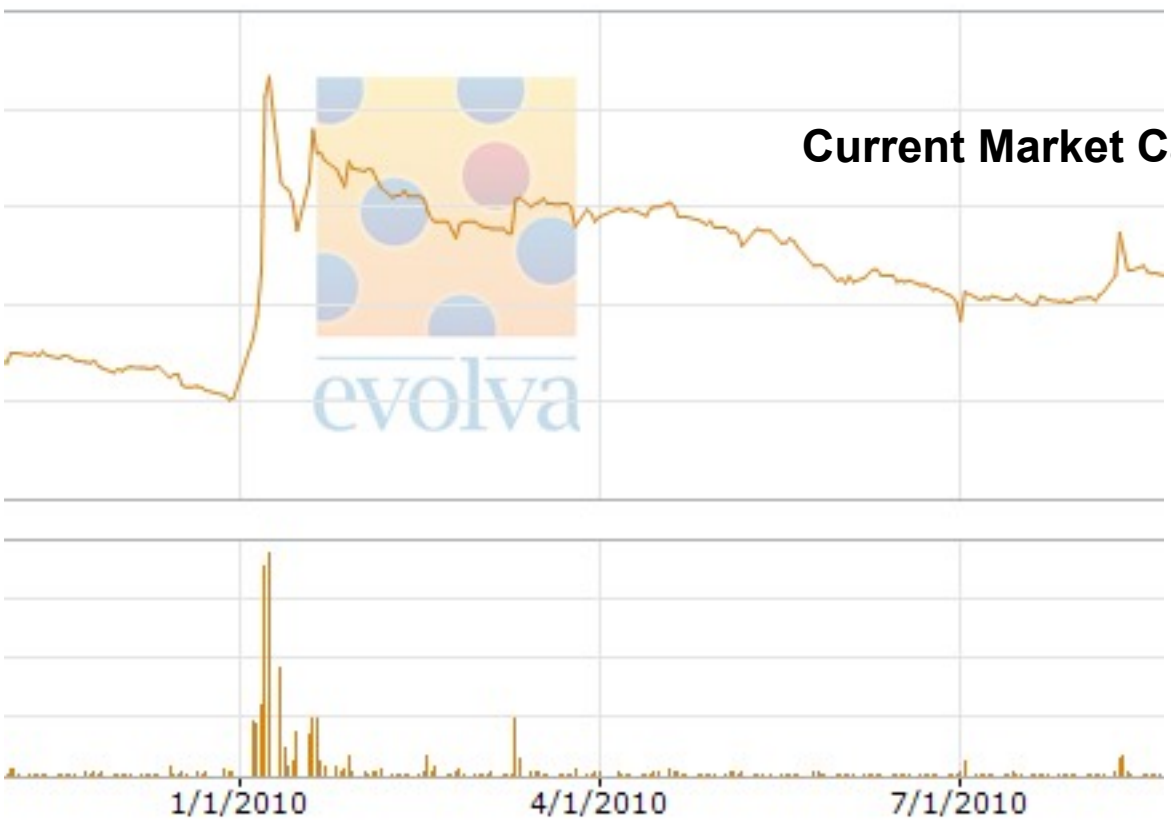
Successful companies focused on discovery-alliance model

Company	Platform	Market Value	2009 Revenues	Listed
Morphosys	Antibody Library Screening	> $490M	€81M	DE
Evolva	Library Screening/Small Molecule	> $320M	CHF $19M	SIX
Evotec	Genetic Library Screening/Small Molecule	> $300M	>€40M	Frankfurt/Nasdaq
Galapagos	Genetic Library Screening/Small Molecule	> $390M	€100M	EuroNext

Model also allows for internally funded clinical development pipeline as companies grow

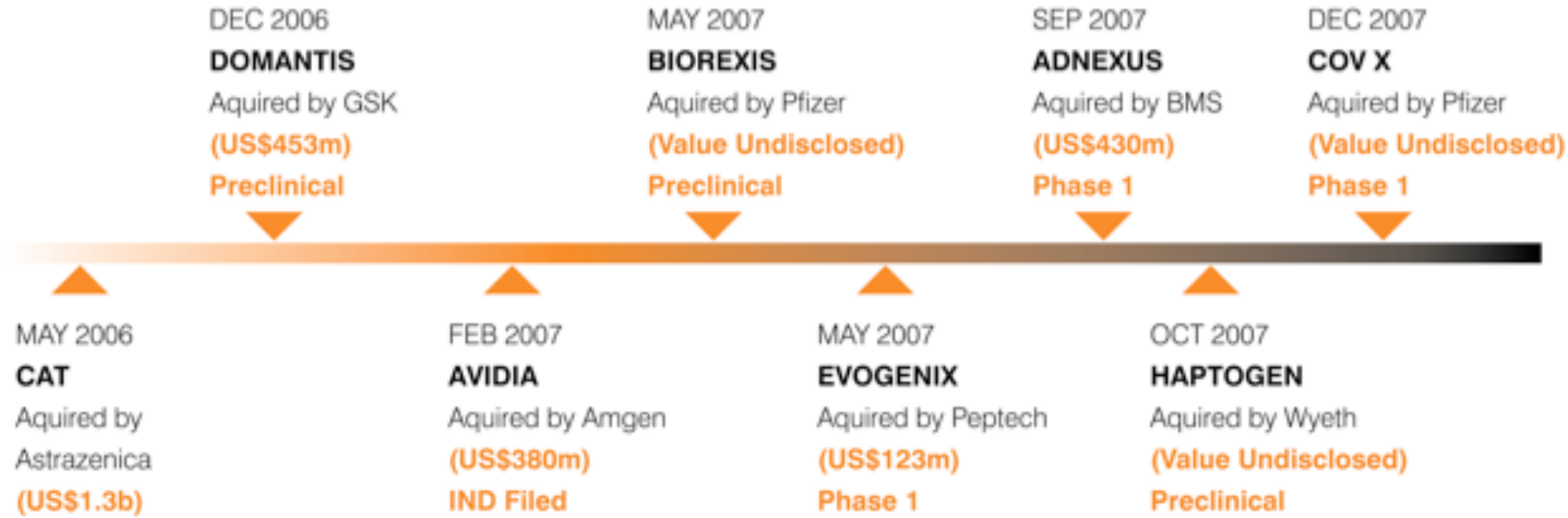
Evolva: a young specialist drug discovery company

Roche Discovery Deal (4/1/10)



Current Market Cap. $320 Million

M&A activity in biologics discovery points to value of libraries



- *Eight acquisitions of companies with biologics discovery libraries in less than 2 years*
  - *Average valuation at acquisition of $380M*
- *62% of companies acquired at pre-clinical stage – a unique library is often the key asset*
- ***Pharma values drug discovery engines with associated proprietary drug libraries***
- ***Phylogica is a capital growth company and plans to exit by trade sale within 2 years***

Phylomer libraries: the richest source of bioactive peptides with activity against disease targets inside or outside cells

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Addressing the challenge of peptide drug discovery

- **Peptide market growing nearly twice as fast as small molecules**
- 33 marketed peptides represent $4 billion market (excluding insulin)
- Insulin market alone worth $14 billion
- 178 peptides in clinical development
- 400 peptides in advanced preclinical development (tip of the iceberg)
- Virtually all peptides come from analogues of natural peptides
- **Discovery of novel drug-like peptide sequences *de novo* has proved challenging**

- **Phylogica has developed a next generation peptide discovery platform**
- most diverse set of peptide structures available
- bigger pool of different structures to choose compounds from
- libraries yield best quality and quantity of peptide hits available

Phylomer® Peptides

- **Phylomers** - new class of therapeutic peptides derived from natural protein fragments (average size about 30 amino acids)
- Encoded from biodiverse bacterial genomes, many of which live in extreme environments like volcanic streams, geysers and deep sea volcanic vents
- Phylomer libraries contain several billion distinct peptides
- Phylomer structures are pre-selected by evolution to allow survival, such as high thermal stability

Watt PM (2006) *Nature Biotechnology* 24 (2):177-83

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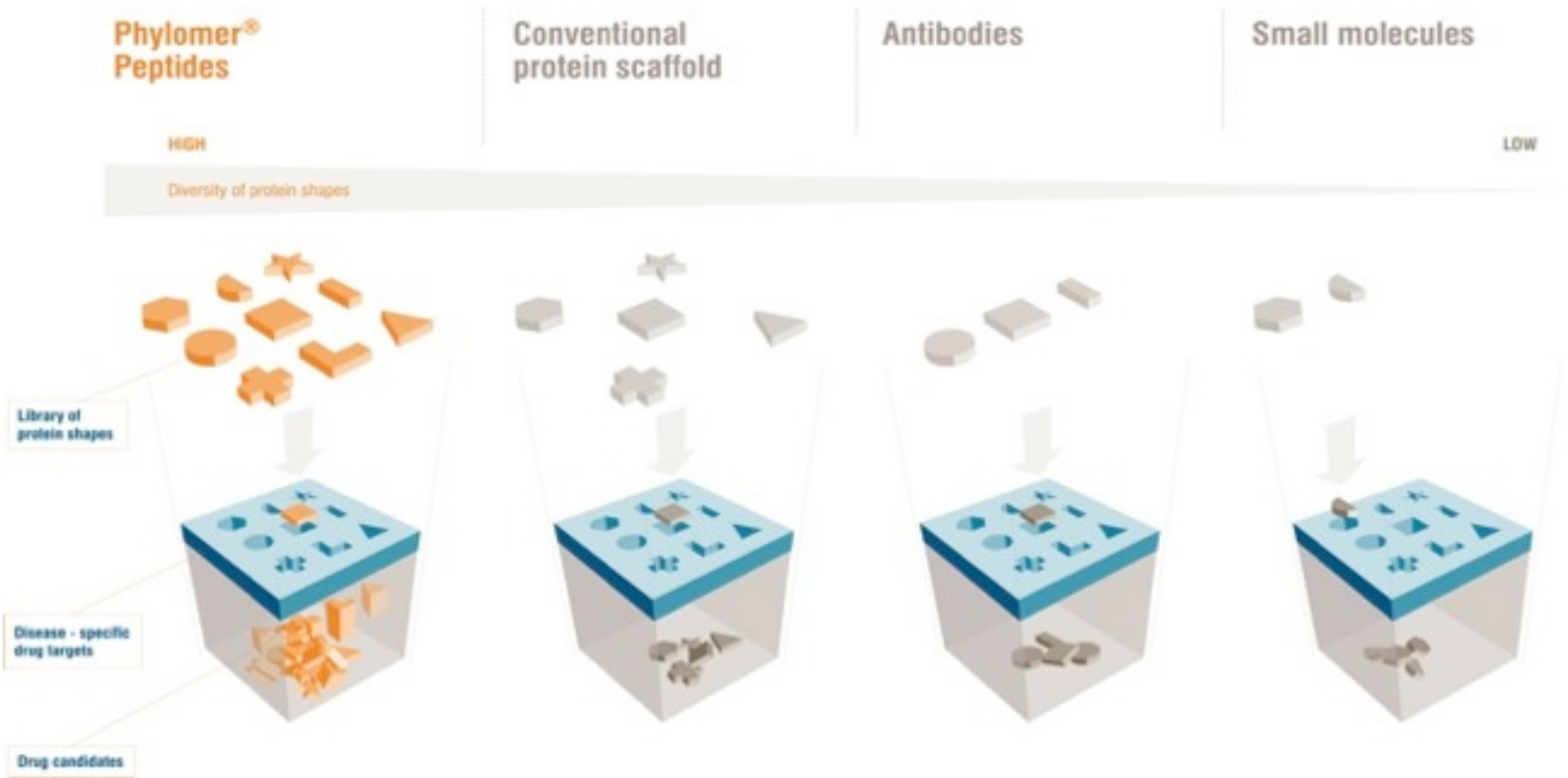
Harvesting the power of structural diversity for drug discovery



Phylomers libraries contain multiple classes of subdomain and supersecondary structures from diverse evolutionary protein lineages

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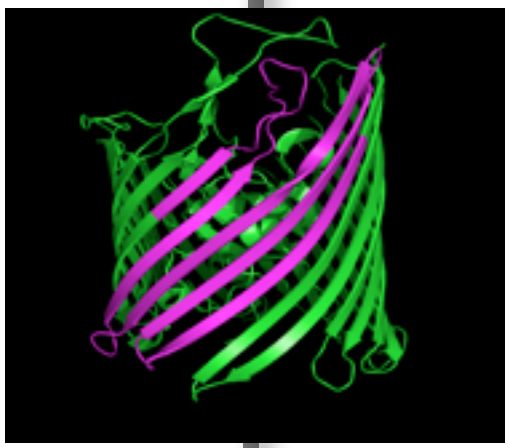
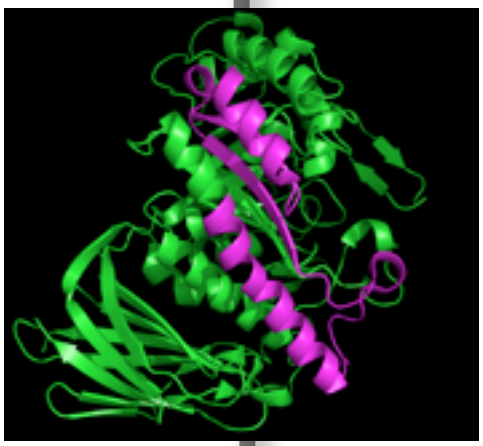
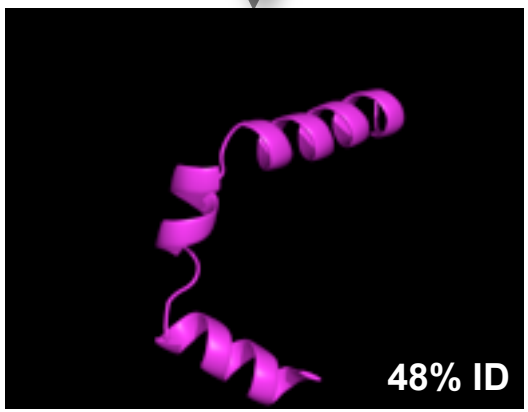
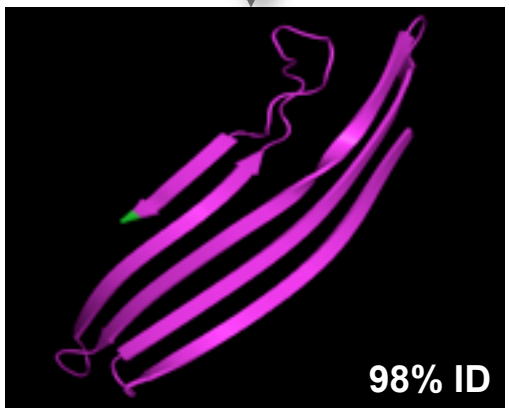
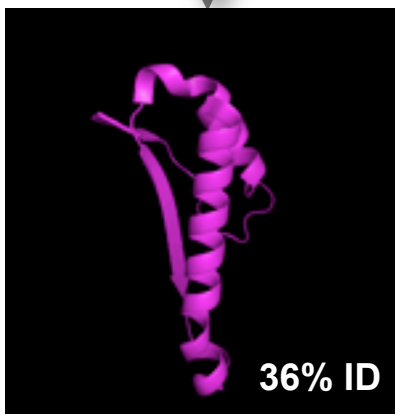
Phylomers from multiple structural families with diversity of shapes

Homologous Crystal Structure

Bacteroides: (40L_0859)	*Bordetella:* (40L_0716)	*Haloarcula*: (40L_0735)
		
S. enterica. **(dTDP-D-glucose 4,6-dehydratase)**	***E. coli.*** **(Ferric siderophore receptor)**	***B. stearothermophilus*** **(*Alpha-L-arabinofuranosidase*)**
		

All SCOP Classes Represented

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Phylomer versatility: can block intracellular and extracellular targets

- Primary hits show *in vitro and in vivo* bioactivity against extracellular and intracellular target classes

- **Intracellular screens:**
  - *In vitro*: AP-1 pathway, MAL adaptor
  - *In vivo*: acute airways inflammation, burns, stroke, traumatic brain injury
  - Roche deal for discovery new cell penetrating peptides

- **Extracellular screens:**
  - *In vitro*: CD40L, GM-CSF, TNFα, TNFR, IL13, antimicrobial etc.

- Hits exhibit extensive sequence diversity, ie: potential functional and structural diversity

- Highlights potential for Phylomers as target discovery/validation tools

- Best qualtity (pM-low nM) and quantity of specific primary peptide hits available

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Phylogica's Target-Based Deal Structure

Discovery Pharma Partnerships (indicative terms)	
	Value Per Drug Target (US$)
Upfront license fee	$500-$750K
Contract Discovery (3-4 FTE's/yr)	$750K- $1M
Cumulative Milestone Payments	Up to $100M
Royalties	Single digit %

Roche & MedImmune

Roche

- Signed December 2009
- Discovery of new cell penetrating peptides
- Project completed and review of milestone achievements in progress
- $435,000 for option fee and a pre-negotiated 8 figure option exercise deal
- Full back license to Phylogica to cell penetrating peptides for phylomer delivery

MedImmune

- Signed August 2010
- Collaborative discovery project, with potential development and commercialization of resulting novel antibiotics by MedImmune.
- Objective - to identify drug candidates with potent activity against the gram-negative bacterium, *Pseudomonas aeruginosa*. This highly prevalent, opportunistic pathogen is one of the most common causes of hospital-acquired infections, which can be life-threatening for patients with pneumonia or cystic fibrosis.
- Terms - upfront payment of US$750k and an additional US$750k in committed research funding for an initial 12-month period. Plus development, regulatory and commercial milestone payments of up to US$98 million and royalties on potential worldwide sales.

Strong intellectual property estate

- Patents cover methods of making and screening Phylomer libraries and composition-of-matter on peptides and the libraries themselves

- 16 patent families, 26 granted/ allowed patents and 27 patent applications covering the markets of US, Europe, Japan and Australia

- Granted Composition of Matter Claim (Europe)
  "A gene fragment expression library comprising a plurality of different nucleotide sequences from a plurality of biodiverse organisms, each having a sequenced genome and wherein the organisms are microorganisms and/or eukaryotes having compact genomes"

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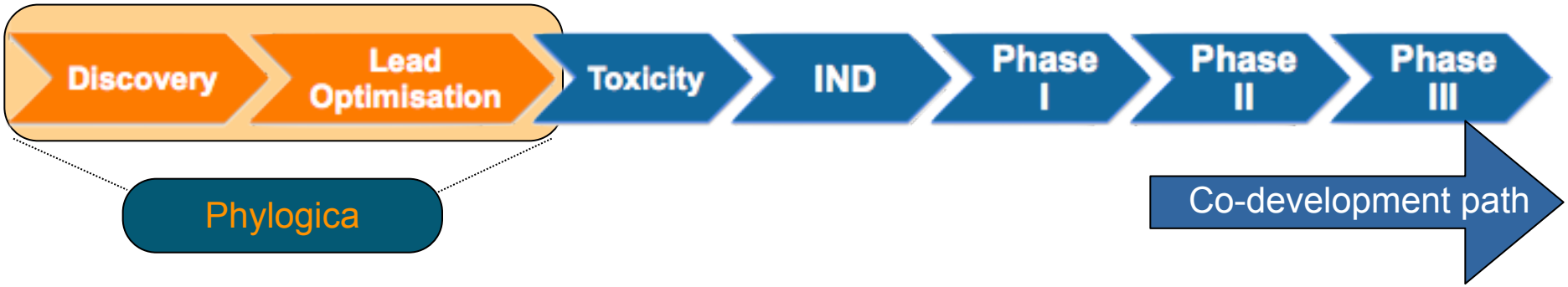
Phylogica's Focus on Drug Discovery (2009-)

- Core strength = a unique drug discovery engine and a rich source of peptide drug leads

- Focusing on Drug Discovery model



- Platform now fully supported and scaleable.

- Business offering now gaining commercial traction

Technical Validation of Phylomer libraries

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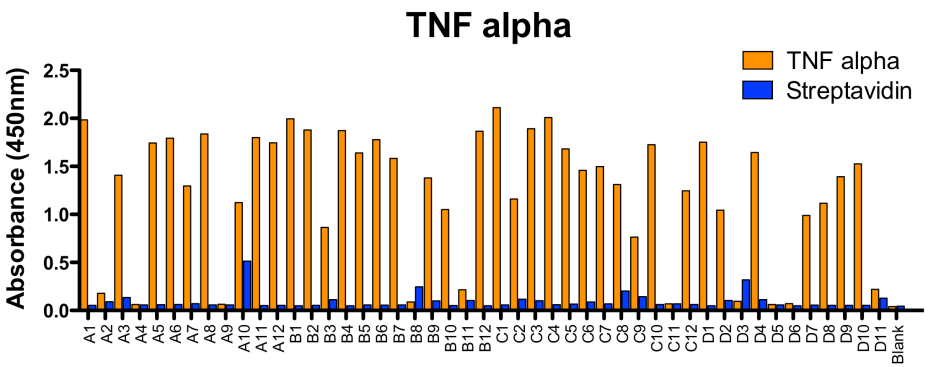
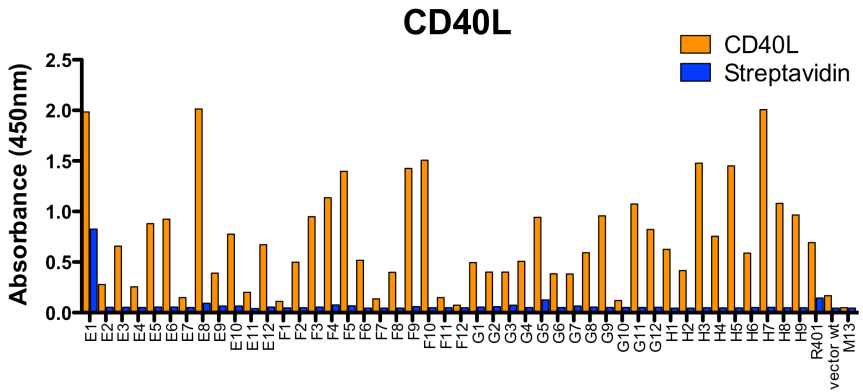
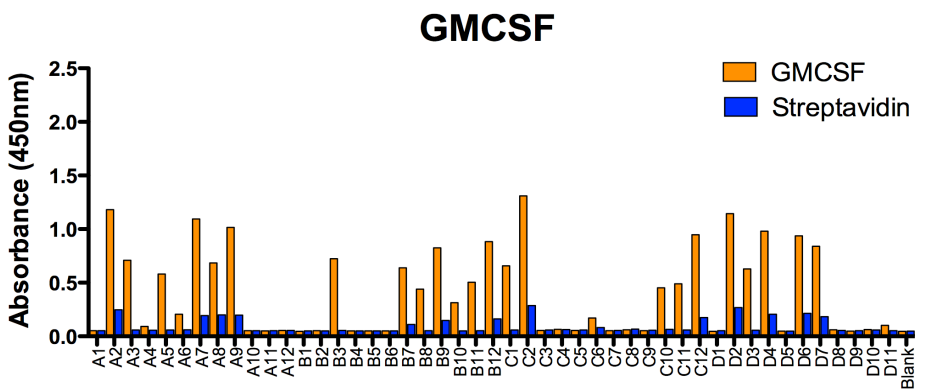
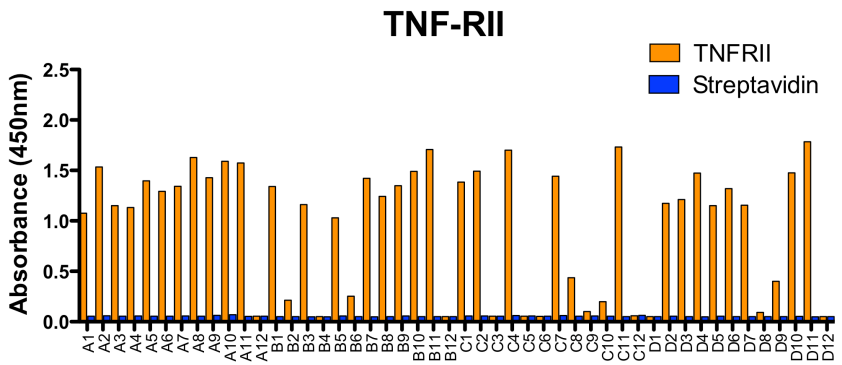
Phylomers bind multiple target classes









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Phylomer affinities before maturation (Primary hits)

- Primary phage screens identified many unique Phylomer hits against CD40L with IC_{50}'s under 500nM (Phage Competition ELISA)
- Peptides expressed as recombinant fusions with Maltose Binding Protein (MBP) and then affinities determined using Octet Red (ForteBio)
- Affinities range from high pM (350 pM) to mid nM

Peptide	Size	Charge	Affinity (Octet Red) rMBP-Peptide Fusion		
			hCD40L (nM)	TNF (nM)	GMCSF (nM)
40L_2	19	-1	**21**	none	none
40L_4	18	0	**13**	none	none
40L_6	18	0	**24**	none	none
40L_42(b)	23	+1	**3**	none	none
40L_721	28	-4	**9**	none	none
40L_859	36	-7	**0.35**	none	none
M1_818	32	-2	**0.42**	none	none
40L_901	37	-1	**0.9**	none	none
40L_1049	75	-11	**1**	none	none

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Phylomer library advantages

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- High rates of functional peptide hits
  - *Biological activity, low-mid nM affinities*
  - *Fast discovery process*

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Library versatility

- *Intracellular targets*
- *Extracellular targets*
- *Phenotypic screens*

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Multiple sequence families in hits

- *Identify minimal binding units in the biologics world*
- *Faster, more versatile SAR*
- *Phylomer libraries offer the biologics equivalent of Diversity Oriented Synthesis of small molecules*

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Phylomer peptide advantages

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Amenable to chemical synthesis

- *Scalable and controllable*
- *Cost-effective*
- *Customisation of drug properties*

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Alternative delivery potential

- *Intra-nasal, sub-lingual*

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- Access to Intracellular targets (via protein transduction)
- Novel IP positions on targets
  - *Opportunity to break target patents*

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Well-positioned for commercial success

- Extensive evaluation studies validate high quality of Phylomer library hits
- Multiple *in vivo* efficacy studies support therapeutic potential of Phylomer peptides
- Versatility of libraries endorsed by international research collaborations
- Drug discovery deal with Roche in December 2009
- Drug discovery deal with Medimmune/AstraZeneca in August 2010
- Deal discussions progressing with >20 prospective pharma partners
- Late-stage negotiations with three major pharma/biotech companies
- Developing new generation Phylomer libraries to expand discovery platform
- Building screening capabilities for future strategic alliances

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Phylogica's Discovery Partners

MedImmune, Inc.

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Summary

- Well positioned for commercial success
- Unique drug discovery resource for pharmaceutical industry
- Technology is fully validated, scalable and optimized for commercialization
- Broad patent protection for entire class of drugs
- Initiated commercialization phase with two deals executed and others in negotiation
- Strategy for near-term cash-sustainability, driven by fee-for-service drug discovery
- Objective to secure an increasing share of down-stream value through co-development
- Potential exit opportunities via trade sale or major strategic alliance

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Phylogica Ltd
ASX: PYC

www.phylogica.com