
Bioxyne
David Radford CEO
April 2012

Our mission is to identify and develop, a range of therapies based on technology utilising the application of mucosal immunology to treat common human diseases

Agenda

- Who we are
- Short-term focus – COPD therapy
- Long-term opportunities
- Forthcoming milestones
- Summary
- Appendices

BIOXYNE – WHO WE ARE

Corporate overview

- Created by merger of Hunter Immunology and Probiomics Limited in April 2012
- Listed on ASX (BXN), market cap AU$30m
- Commercialising proprietary immunotherapy technology with multiple applications
  - Immediate focus on the commercialisation of therapeutic asset - HI-1640V – being developed to address major unmet clinical needs of patients with common airways disease, Chronic Obstructive Pulmonary Disease (COPD)
  - Opportunity to target a number of other applications using the same mucosal immunology technology platform
- Experienced leadership with proven ability to deliver shareholder value backed by strong institutional support

Commercially-focused management and board

Ian Mutton	Chairman and Non-Executive Director
David Radford	CEO and Non-executive Director Former CEO of Nanosonics
Doug Wilson	Non-Executive Director Former Medical Director, Boehringer Ingelheim
Jeremy Curnock Cook	Non-Executive Director Intersuisse Bioscience Managers
Glenn Crisp	Senior Partner, Crisp Legal
William Harrison	Non-Executive Director Head of Business Development,Operations Asia, Middle East, Africa for Novartis Pharma AG
Patrick Ford	Non-Executive Director Veritas Securities

Financial and shareholder snapshot

ASX code:	BXN
Market cap:	~$30 million
Shares on issue:	149 million
Reported Cash:	$2.49million
Top-20 holders:	66.2%
SP high low:	$0.25-$0.17
Sector:	Biotechnology

Major shareholders:

- Octa Phillip Asset Mgmt 21%
- Dr Philip Comans 9.6%
- Mr Chris Cuffe 7.0%
- PT Soho Industri Pharma 6.5%
- Prof Robert Clancy 6.4%
- University of Newcastle 3.2%

A SHORT-TERM OPPORTUNITY HI-164OV TO TREAT COPD

Novel treatment for COPD

- Based on proprietary technology platform
- Solid intellectual property estate
- Lead asset is **HI-1640V**, a novel therapy to mitigate the symptoms of ‘exacerbations’ caused by respiratory infections in patients with COPD
  - Phase IIb human clinical trial due to report in June 2012
  - Designed to be used in conjunction with current treatments to improve their efficacy and reduce healthcare costs
- Currently no specific therapies to prevent such ‘exacerbations’

COPD – urgent need for improved therapy

- COPD is characterised by:
  - Emphysema and chronic bronchitis
  - Reduced airways capacity
  - Exacerbations - sudden worsening of symptoms
- Traditionally associated with smokers but today ~20% of newly diagnosed patients have never smoked
- Significant economic impact upon health services
- Current treatment regimes include corticosteroids, bronchodilators and antibiotics
- A reduction in the hospitalisation of COPD patients would deliver significant healthcare cost savings, economic benefit and patient quality of life improvements
- Global COPD drug market worth $8.3 billion in 2010 (The Pharmaletter, Dec 19, 2011)

What is HI-1640V

- HI-164OV is a novel immunotherapy designed to improve outcomes when used in combination with current standard of care
  - Does not seek to change medical practice. Complimentary to existing therapies
- It is an‘enteric-coated tablet’ containing killed *H.influenzae* bacteria
  - Immune cells migrate to airways and provide protection against *H.influenzae*
  - Works by stimulating an immune response in the patient
- Competitive advantages
  - Annual treatment - convenient
  - Needle free oral administration – patient acceptance and compliance
- Aim is to reduce infections and inflammation that cause exacerbations and associated hospitalisation

COPD – market is significant

- COPD is a major target of global pharmaceutical research
- Global incidence growing rapidly in direct proportion to smoking and pollution in the developing world (BRIC - Brazil, Russia, India, Indonesia, China)
- COPD is a major cause of morbidity and mortality globally (4th largest in USA)
- Projected to be 3rd most common cause of death worldwide by 2020
- Currently no effective treatments ~25% of patients die in 1 year following hospital admission
- Annual direct costs to treat COPD estimated at over $29.5 billion in the USA
- It is expected that a reduction in hospitalisation could generate savings in healthcare costs

HI-1640V – achievements to date

- Positive Phase IIa human clinical trial results
- Primary end points: Number of episodes of acute bronchitis; duration of bronchitis and number of courses of antibiotics
  - 38 patient trial for moderate to severe COPD showed HI-1640V reduced hospitalisation and exacerbations by 90 per cent
  - Large reduction in use of steroids (63%) and antibiotics (56%)
  - No safety issues
- Results published in leading peer reviewed journal, CHEST (Tandon et al; CHEST 2010; 137(4);805-811)
- Progressed to Phase IIb multi-centre trial

Phase IIb study nearing completion

- Phase IIb 320 patients multi-centre trial
  - 292 Patients have completed the study (March 2012)
  - 21 hospitals around Australia
  - Stringent Double Blinded Protocol
- No signal of safety issues from first 100 patients
- >180 Adverse Events to date provide statistical power to the study
- Primary end points: Reduction in hospitalisation and reduction in corticosteroid usage
- On track to deliver un blinded data in June 2012

HI-1640V – the measure of success

- It is anticipated that a reduction in hospitalisation could deliver significant economic benefits
- Subject to results of Phase IIb trial in June, strategy to explore opportunities to licence, partner or sell
  - Early discussions with potential pharma partners initiated
- Focus will be on best route to commercialisation at greatest value
- Successful outcome would create shareholder value over the short term as well as longer term growth options

LONG-TERM OPPORTUNITIES
THERAPEUTICS AND PROBIOTICS

A business with multiple opportunities

HI164-OV Therapeutics

- COPD
  Phase IIb
- Asthma
  pre-clinical evaluations
- Otitis media
  patent lodged. Under evaluation

Therapeutic Probiotics

- Lactobacillus fermentum VRI003
  Marketed

Risk-balanced strategic options

Human therapeutics

HI-164OV

Positive data from Phase IIb COPD trial

Sale of IP - commercialisation deal with pharma

One off significant revenue from COPD commercialisation deal

Co-development/ commercialisation deal with pharma

Revenues from upfronts, milestones & royalties in COPD

Exploit mucosal immunology platform in other applications

Future revenues from upfronts, milestones & royalties on pipeline

Therapeutic probiotics

Immediate opportunities to leverage potential for probiotic business

Revenues from OTC sales of Probiomics products

$ $ $ **Funds generated by HI-164OV invested in development of therapeutic and probiotic businesses**

FORTHCOMING MILESTONES

Results focused commercialisation strategy

Milestone-driven and outcomes focused

Q1-2012

ASX listing- Bioxyne

Q2-2012

Phase IIb trial results HI-164OV

Q2-2013

License/JV/ Sale of HI-164OV

2013

Further development of therapeutic applications

SUMMARY

Summary

- Commercially-focused Sydney-based ASX-listed immunotherapeutics company
- Potential to create world-class business based on mucoscal immunology platform
- Short term opportunity for value creation from lead therapy HI-164OV, being developed to address major unmet clinical needs of patients with common airways disease, Chronic Obstructive Pulmonary Disease (COPD), subject to mid year data
- Risk-balanced longer term business strategy
  - Development of novel immunotherapies for large disease markets based on proprietary, patent-protected technology
  - Revenue generating business stream from probiotics
- Experienced leadership with proven ability to deliver shareholder value backed by strong institutional support

APPENDICES

Solid intellectual property estate

Patent	Description	Filing Date	Jurisdiction
PT004	Asthma Treatment	March 2008	Major International countries
PT006	ETxB Carrier Protein	June 2002	USA/WIPO
PT011	HI-164 Isolate	Sept 2009	Major International countries
PT001	Isolate Selection	August 2005	Major International Countries
PT007	Probiotic Complement	May 2001	Major International Countries

COPD market in AU, UK and US

Country	COPD Hospitalisation Events/Annum	Average Days of Hospitalisation	Reference
Australia	>54,000	7.5	www.cancerwa.asn.au/ resources/2009-12-22- facts- on copd& smoking
United Kingdom	>109,000	10	Halpin & Miravitlles-COPD The Disease and its burden to society. Proc. Am Thoracic Soc; Sept1, 2006, V3, #7. 619-623
USA	>800,000	4.8	Wier et al www.hcup-us.ahrq.gov/ reports/statsbriefs/ sb106.pdf

Market Sizing – COPD

Prevalence Table (COPD)

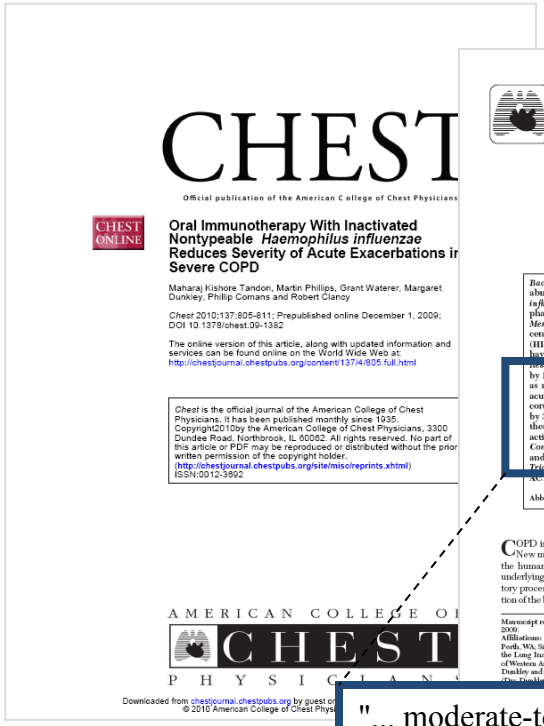
Country	Study	Diagnostic Approach	Age, yr	COPD Prevalence (%) Overall
Spain	Pena et al*	Spirometry	40-69	9.1
World	Halbert et al**	Spirometry	≥ 40	9 to 10
		Patient-reported diagnosis		3.7
		Physician diagnosis		4.1
World (Stage II or higher)	Buist et al 2007	Spirometry (GOLD)	≥ 40	10.1
New Zealand	Shirtcliffe et al 2007	Spirometry	≥ 40	14.2
Mexico (Mexico City)	Menezes et al 2005 (PLATINO study - funded by Boeringher Engelheim)	Spirometry	≥ 40	7.8
Brazil (Sau Paulo)	Menezes et al 2005 (PLATINO study - funded by Boeringher Engelheim)	Spirometry	≥ 40	15.8
Chile (Santiago)	Menezes et al 2005 (PLATINO study - funded by Boeringher Engelheim)	Spirometry	≥ 40	16.9
Uruguary (Montevideo)	Menezes et al 2005 (PLATINO study - funded by Boeringher Engelheim)	Spirometry	≥ 40	19.7
Venezuela (Caracas)	Menezes et al 2005 (PLATINO study - funded by Boeringher Engelheim)	Spirometry	≥ 40	12.1
Turkey	Gunen et al 2008	Spirometry and questionairre	≥ 40	18.1
Japan	Fukuchi et al 2004	Spirometry	≥ 40	10.9

- An average of >10% of the population >40 has some form of COPD

Recent respiratory transactions

Company	Partner	Value
Roche (2010)	Galapagos	>USD580m
Forest (2009)	Nycomed	USD100m (US rights only)
J&J	2 respiratory deals e.g Acquisition of Respivert	Not public
Boehringer Ingelheim (2008)	Milestone driven deals. Partner not disclosed	Not public
Novartis(2005)	Alaris & Vectura	USD375m

Clinical Publications – HI-164OV


CHEST

Official publication of the American College of Chest Physicians

CHEST ONLINE

Oral Immunotherapy With Inactivated Nontypeable *Haemophilus influenzae* Reduces Severity of Acute Exacerbations in Severe COPD

Maharaj Kishore Tandon, Martin Phillips, Grant Waterer, Margaret Dunkley, Phillip Comans and Robert Clancy

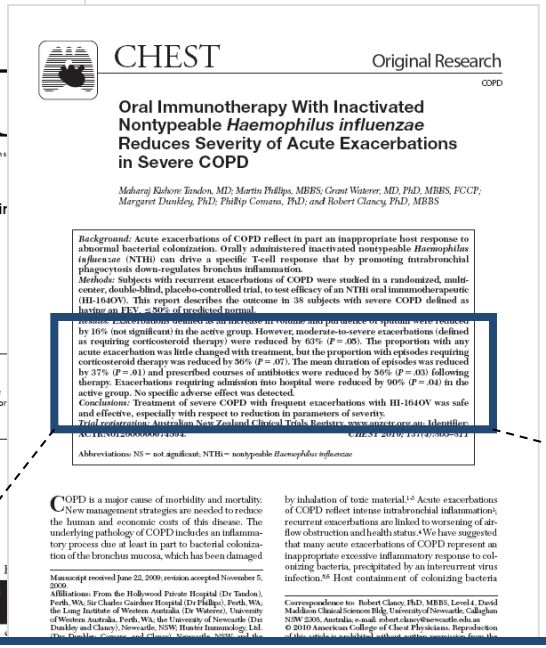
Chest 2010;137;805-811; Prepublished online December 1, 2009; DOI 10.1378/chest.09-1382

The online version of this article, along with updated information and services can be found online on the World Wide Web at: http://chestjournal.chestpubs.org/content/137/4/805.full.html

Chest is the official journal of the American College of Chest Physicians. It has been published monthly since 1935. Copyright2010by the American College of Chest Physicians, 3300 Dundee Road, Northbrook, IL 60062. All rights reserved. No part of this article or PDF may be reproduced or distributed without the prior written permission of the copyright holder. (http://chestjournal.chestpubs.org/site/misc/reprints.xhtml) ISSN:0012-3692

AMERICAN COLLEGE OF CHEST PHYSICIANS

Downloaded from chestjournal.chestpubs.org by guest on
© 2010 American College of Chest Physi


CHEST Original Research

COPD

Oral Immunotherapy With Inactivated Nontypeable *Haemophilus influenzae* Reduces Severity of Acute Exacerbations in Severe COPD

Maharaj Kishore Tandon, MD; Martin Phillips, MBBS; Grant Waterer, MD, PhD, MBBS, FCCP; Margaret Dunkley, PhD; Phillip Comans, PhD; and Robert Clancy, PhD, MBBS

Background: Acute exacerbations of COPD reflect in part an inappropriate host response to abnormal bacterial colonization. Orally administered inactivated nontypeable *Haemophilus influenzae* (NTHi) can drive a specific T-cell response that by promoting intrabronchial phagocytosis down-regulates bronchus inflammation.
Methods: Subjects with recurrent exacerbations of COPD were studied in a randomized, multicenter, double-blind, placebo-controlled trial, to test efficacy of an NTHi oral immunotherapeutic (HI-164OV). This report describes the outcome in 38 subjects with severe COPD defined as having an FEV$_1$ < 50% of predicted normal.
[illegible] by 16% (not significant) in the active group. However, moderate-to-severe exacerbations (defined as requiring corticosteroid therapy) were reduced by 63% ($P = .05$). The proportion with any acute exacerbation was little changed with treatment, but the proportion with episodes requiring corticosteroid therapy was reduced by 56% ($P = .07$). The mean duration of episodes was reduced by 37% ($P = .01$) and prescribed courses of antibiotics were reduced by 56% ($P = .03$) following therapy. Exacerbations requiring admission into hospital were reduced by 90% ($P = .04$) in the active group. No specific adverse effect was detected.
Conclusions: Treatment of severe COPD with frequent exacerbations with HI-164OV was safe and effective, especially with respect to reduction in parameters of severity.
Trial registration: Australian New Zealand Clinical Trials Registry, www.anzctr.org.au, Identifier: ACTRN012[illegible]
CHEST 2010; 137(4):805–811

Abbreviations: NS = not significant; NTHi = nontypeable *Haemophilus influenzae*

COPD is a major cause of morbidity and mortality. New management strategies are needed to reduce the human and economic costs of this disease. The underlying pathology of COPD includes an inflammatory process due at least in part to bacterial colonization of the bronchus mucosa, which has been damaged by inhalation of toxic material.[1-3] Acute exacerbations of COPD reflect intense intrabronchial inflammation[4]; recurrent exacerbations are linked to worsening of airflow obstruction and health status.[4] We have suggested that many acute exacerbations of COPD represent an inappropriate excessive inflammatory response to colonizing bacteria, precipitated by an intercurrent virus infection.[5,6] Host containment of colonizing bacteria

Manuscript received June 22, 2009; revision accepted November 5, 2009.
Affiliations: From the Hollywood Private Hospital (Dr Tandon), Perth, WA; Sir Charles Gairdner Hospital (Dr Phillips), Perth, WA; the Lung Institute of Western Australia (Dr Waterer), University of Western Australia, Perth, WA; the University of Newcastle (Dr Dunkley and Clancy), Newcastle, NSW; Hunter Immunology, Ltd. (Dr Phillips, Comans, and Clancy), Newcastle, NSW; and the
Correspondence to: Robert Clancy, PhD, MBBS, Level 4, David Maddison Clinical Sciences Bldg, University of Newcastle, Callaghan NSW 2308, Australia; e-mail: robert.clancy@newcastle.edu.au
© 2010 American College of Chest Physicians. Reproduction of this article is prohibited without written permission from the

"... moderate-to-severe exacerbations were reduced by 63%. The proportion with any acute exacerbation was little changed with treatment, but the proportion with episodes requiring corticosteroid therapy was reduced by 56%. The mean duration of episodes was reduced by 37% and prescribed courses of antibiotics were reduced by 56% following therapy. Exacerbations requiring admission into hospital were reduced by 90% in the active group. No specific adverse effect was detected."
Conclusion: Treatment of severe COPD with frequent exacerbations with HI-164OV was safe and effective, especially with respect to reduction in parameters of severity."


Bioxyne