Bionomics

CREATING INNOVATIVE THERAPIES
FOR CNS DISORDERS.

ANNUAL GENERAL MEETING
EXECUTIVE CHAIRMAN'S PRESENTATION

BNO (Australia: ASX)
BNOEF (USA: OTCQX)

November 20, 2019

Central Nervous System (CNS)

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Safe Harbor Statement

Factors Affecting Future Performance

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Bionomics Overview

- Global, clinical stage biopharmaceutical company leveraging proprietary platform technologies, ionX and MultiCore, to discover and develop a deep pipeline of novel drug candidates targeting ion channels in CNS disorders

- Lead candidate, BNC210, is a novel, orally-administered, first-in-class, negative allosteric modulator of the α7 nicotinic acetylcholine receptor, in development for anxiety-, depression-, stress- and agitation-related disorders:
  - Positive data from Phase 2 trial in Generalized Anxiety Disorder (GAD) patients reported in September 2016
  - Phase 2 exploratory trial in Agitation in elderly patients reported in June 2019 showed good safety profile but did not reach primary endpoint
  - **Back on track to leverage large opportunity for treatment of Post-Traumatic Stress Disorder (PTSD)**

- Strategic partnership with Merck & Co., (MSD):
  - Cognition therapeutic candidate (US$20M upfront) entered clinical development and triggered US$10M milestone payment (Q1, CY2017) in a deal valued up to US$506M in upfront, research and milestone payments plus additional royalties on net sales of licensed drugs
  - Merck & Co equity investment in October 2015

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Bionomics Overview …..

- Emerging pipeline of first-in-class ion channel CNS programs:
  - Nav1.7/1.8 clinical candidate (pain) ready for IND enabling studies
  - Kv3.1/3.2 candidate (cognition) identification well advanced, project Q4, CY2019
- Clinical stage oncology pipeline:
  - BNC105: small molecule in two mid stage, externally funded trials in solid and liquid (AML/CLL) tumours
  - BNC101: early stage antibody targeting LGR5 which has completed Phase 1 studies
- Received on 11 November 2019 $5.2M R&D Tax Incentive Refund
- Financials: Cash at 31 October 2019: A$7.66M

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FY2019 and YTD in Review – Key Developments

- October 2018 – BNC210 PTSD trial results – primary endpoint not achieved
- November 2018 – Leadership changes, strategic review, recapitalization
- December 2018 – Receipt of $6.5M R&D Tax Incentive Refund; $650k Licensing Revenue from CTx
- January 2019 – Commencement of BNC105 clinical trial in combination with nivolumab
- February 2019 – Further data analysis of BNC210 Phase 2 PTSD trial shows the potential for significant patient benefit when drug exposure is adequate; new solid dose formulation identified
- May 2019 – Strategic Review outcome and Program updates
- June 2019 – BNC210 Agitation trial in elderly patients results – primary endpoint not achieved
- July 2019 - Bionomics receives Further R&D Tax Incentive Refund for FY2018 of $1.3M
- September 2019 – BNC210 positive feedback from FDA Type C Meeting and Fast Track application filed for PTSD; BNC210 solid dose formulation achieves blood levels for future development in PTSD
- November 2019 – FDA granted Fast Track designation to the BNC210 development program for the treatment of PTSD and other trauma- and stressor-related disorders
- November 2019 Receipt of $5.2M R&D Tax Incentive Refund

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Bionomics' CNS Focused Pipeline

Program	Pre-IND	Phase 1	Phase 2a	Phase 2b	Market Opportunity & Bionomics' Commercial Rights
BNC210 α7 nAChR NAM	PTSD study, 193 pts, results released October 2018				*US$4.7B; 3.4-4% prevalence >18 yrs; ~25% of patients diagnosed and treated; WW rights
	Exploratory study, 38 pts, Agitated Elderly in Hospital Setting, results released June 2019				*US$1.6B; ~3.1% dementia prevalence >40yrs; ~9% agitation patients diagnosed and treated; WW rights
	GAD study, 24 pts, results released September 2015				*US$2.7B; 3.1% GAD prevalence; ~25% diagnosed and treated; ~50% of SSRI patients treated are partial responders or have relapsed; WW rights
	PANIC - CCK model in healthy volunteers				*US$4.4B; 2.7% prevalence; ~50% diagnosed and treated; WW rights
MK# α7 nAChRPAM	Phase 1 Studies Ongoing				US$506M total deal value including upfront and milestone payments; Tiered royalties
PAIN Nav1.7/Nav1/8 Inhibitors	Candidate				
COGNITION Kv Channel Activators	Series Lead				

*Calculated Market Values Assume 5% premium to Trintellix; 2016 AWP for 30-day supply of $380 – compliance adjusted

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BNC210: Back on Track for PTSD!

- BNC210 is back on track to leverage large opportunity for treatment of Post-Traumatic Stress Disorder (PTSD)
  - **October 2018:** Phase 2b trial did not reach primary endpoint on a dosage basis
  - **February 2019:** PK-PD modelling revealed subjects' under-exposed to BNC210 due to liquid suspension being unsuitable for outpatient setting; identified blood exposure levels (25 mg.h/L) projected to meet primary endpoint
  - New solid dose formulation identified (**February 2019**) and demonstrated to achieve blood exposure required for future PTSD trials (**September 2019**)
  - **3QCY2019:** Face-to-Face Type C meeting with FDA to discuss design of a further trial and opportunity for Fast Track designation
  - **September 2019:** Fast Track designation application submitted to the FDA
  - **November 2019:** FDA grants Fast Track designation for BNC210 development program for the treatment of PTSD and other trauma- and stressor-related disorders

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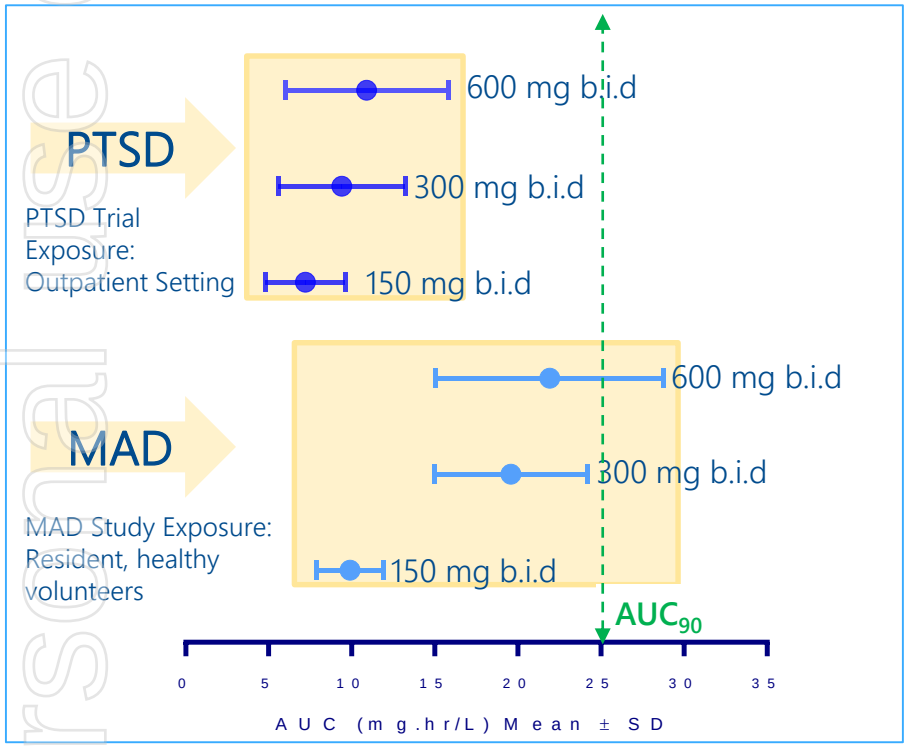
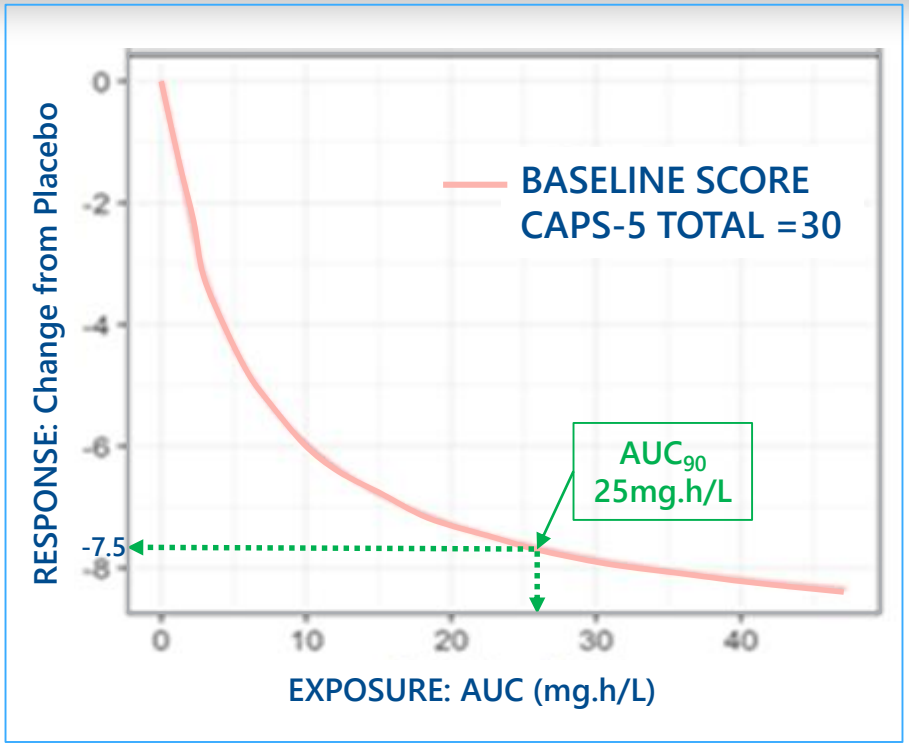
BNC210 Population PK Modelling Indicated Lower-than-Expected Drug Exposure in the PTSD Subjects

Population PK modelling indicated that exposure (AUC) values in the PTSD patients were ~60% of those expected based on data from the healthy volunteer Multiple Ascending Dose study which used the same doses and same suspension formulation with standardised meals.



An Exposure-Response Relationship was Established for CAPS-5 Total Severity Scores (<0.01), where Higher AUC Values were Related to a Larger Effect



Shown here is the model-predicted exposure-response curve for a subject with a baseline CAPS-5 score of 30 – this was the mean baseline score for patients on the PTSD trial in the 600 mg, b.i.d. treatment group.

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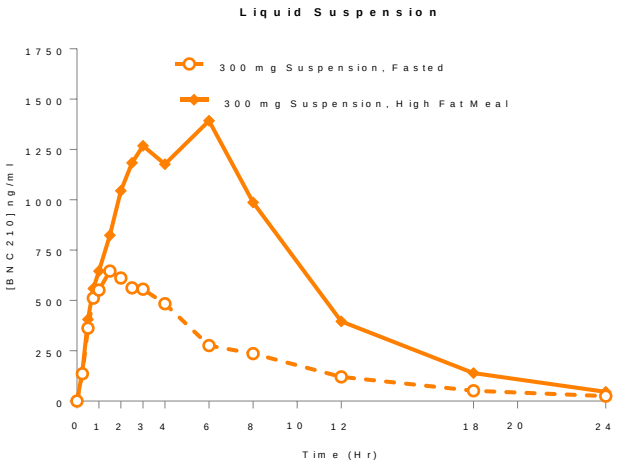
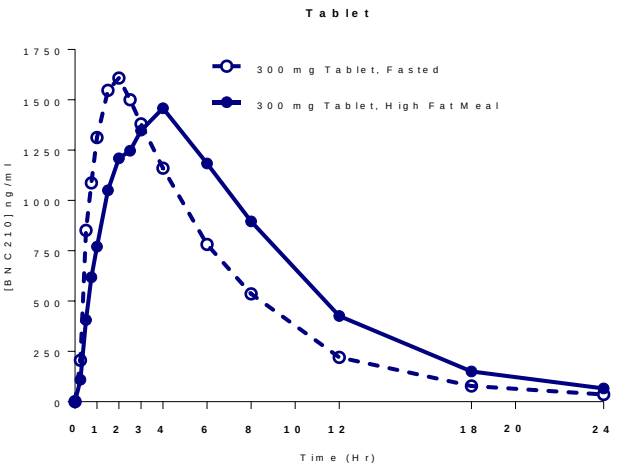
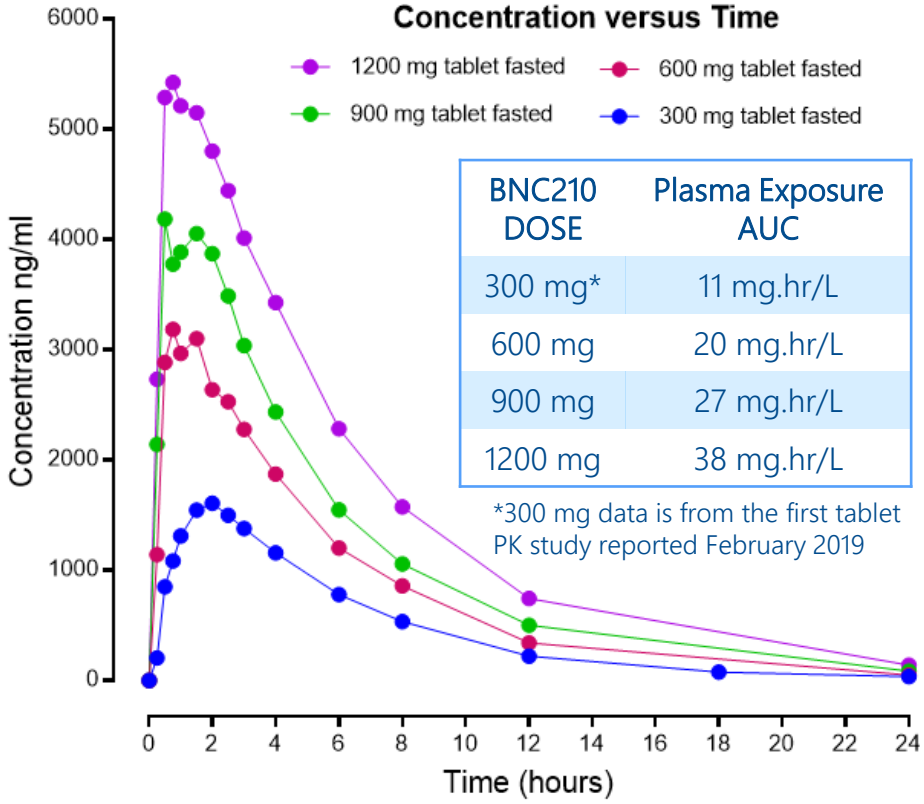
BNC210 Tablet Formulation has Dose Linear Exposure and Overcomes Food Effect of the Liquid Suspension

BNC210.009: 300 mg dose of liquid suspension with food versus 300 mg doses of solid dose formulation, fed and fasted

BNC210.010: 600, 900 and 1200 mg doses of solid dose formulation in fasted subjects







BNC210 DOSE	Plasma Exposure AUC
300 mg*	11 mg.hr/L
600 mg	20 mg.hr/L
900 mg	27 mg.hr/L
1200 mg	38 mg.hr/L

*300 mg data is from the first tablet PK study reported February 2019

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Continuing Development of BNC210 for the Treatment of PTSD: Key Future Milestones

Calendar Year 2020:

- Further develop the prototype tablet formulation to optimize the formulation for a Phase 2b clinical trial
- Manufacture BNC210 tablets for human use and conduct a multiple dosing pharmacokinetic clinical trial in healthy volunteers to select the dose for the Phase 2b trial (targeting ≥25 mg.h/L)
- Manufacture BNC210 drug substance and tablets on a large scale for Phase 2b drug supply

Calendar Years 2021 – 2022:

- Conduct a Phase 2b clinical trial in ~200 PTSD patients comparing BNC210 with placebo
- Compare the change in CAPS-5 total severity scores over a 12 week treatment period. CAPS-5 (Clinician-Administered PTSD Scale for DSM-5) is the FDA-accepted efficacy endpoint for PTSD clinical trials

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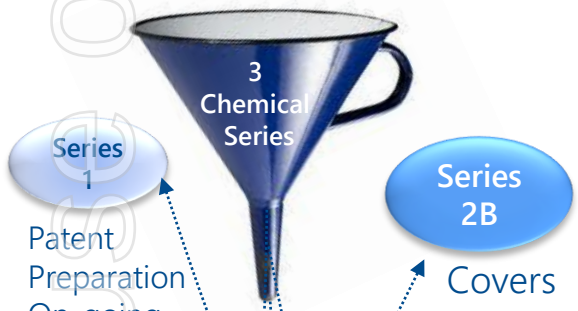
Kv3.1 / Kv3.2 Activators: A Promising Therapeutic Strategy for Improving Cognitive Dysfunction and Negative Symptoms

PROGRAM OUTLINE

CHEMISTRY STARTING POINTS

Bionomics Compound Library | *Compounds from Literature*

~600 COMPOUNDS SYNTHESIZED



Patent Preparation On-going

Covers **LEAD COMPOUND** PCT/AU2019/051194 Priority date 25/3/2019

Covers **BACK-UP COMPOUNDS** PCT/AU2019/051013 Priority date 21/9/2018

BIOLOGY AND CHEMISTRY ACTIVITIES ONGOING IN PREPARATION FOR IND-ENABLING STUDIES

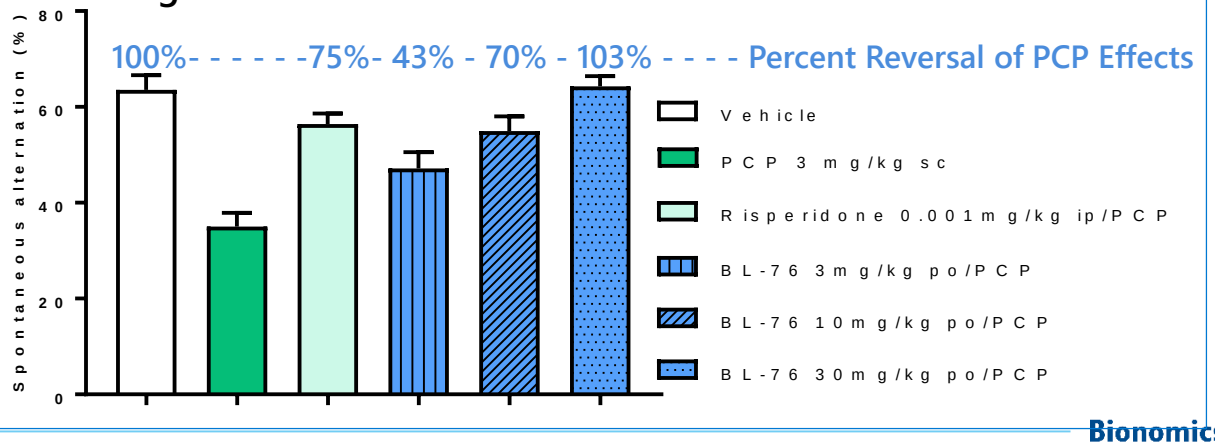
BIONOMICS' MOLECULES TARGET Kv3.1/2 ION CHANNELS ON PARVALBUMIN POSITIVE GABAERGIC INTERNEURONS IN PFC*

*PFC = Pre-Frontal Cortex

Kv3.1/2 Channel Properties:

- Have high and selective expression on parvalbumin positive (PV+) interneurons
- Are potassium channels which confer fast-spiking properties to PV+ GABA-ergic interneurons
- These fast spiking properties provide feedback inhibition to pyramidal cells and permit simultaneous firing of pyramidal cells at gamma frequencies (30–80 Hz).
- Kv3.1 and 2 expression is reduced/altered in disorders with severe cognitive impairment, including poor social cognition and social withdrawal
- Examples are: Schizophrenia, Autism Spectrum disorder and Alzheimer's disease

Lead Compound BL-76 Fully Reverses PCP-induced Cognitive Deficit in Mice in the T-maze



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PanNav Inhibitors have Potential as Effective, Non-Addictive, Therapeutics for Chronic Pain with Less Side Effects

BIONOMICS HAS DEVELOPED MOLECULES WITH FUNCTIONAL SELECTIVITY FOR SEVERAL VOLTAGE GATED SODIUM CHANNELS (VGSCs):

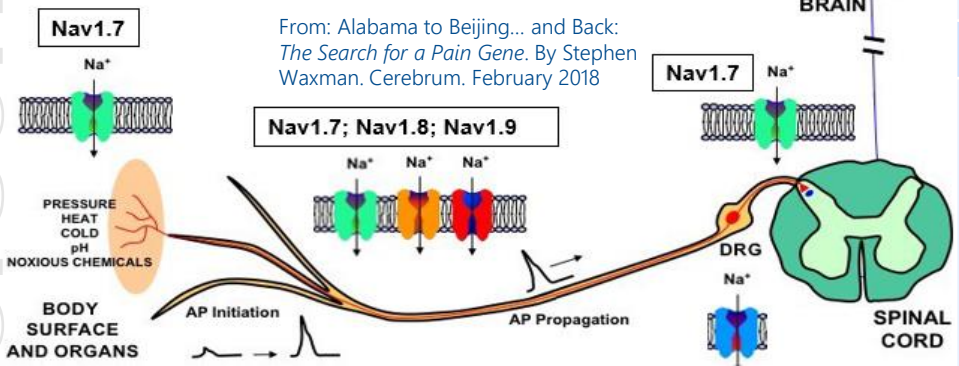
- Navs 1.7, 1.8, and 1.9 are responsible for the generation and conduction of action potentials in the peripheral nociceptive neuronal pathway.
- Gain- or Loss-of-function mutations in Nav1.7, 1.8 and 1.9 have been associated with human pain syndromes where extreme pain or no pain is experienced.
- Molecules and antibodies selectively targeting just Nav1.7 or Nav1.8 have not been clinically successful whereas molecules with activity at multiple VGSCs continue to progress in the clinic

KEY FEATURES OF LEAD MOLECULE:

- Improved in vivo efficacy and safety window compared to BIIB074
- Functionally selective inhibition of Nav1.7, 1.8 and 1.3 (CNS)
- Permeability to allow access to Nav1.3 channels in spinal dorsal horn/CNS
- Good drug-like properties

INTELLECTUAL PROPERTY: THREE SERIES DEVELOPED: THREE Composition-of-Matter Patents Filed:

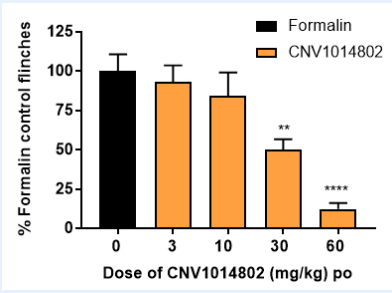
1. **LEAD MOLECULE COVERED IN:** PCT/AU2019/050472). Filing Date: 17 May 2018
2. PCT/AU2019050471). Filing Date: 17 May 2018 ✓FTO
3. PCT/AU2018/051409). Filing Date: 27 Dec 2017.

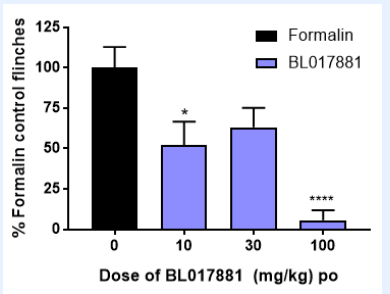


From: Alabama to Beijing… and Back: *The Search for a Pain Gene*. By Stephen Waxman. Cerebrum. February 2018

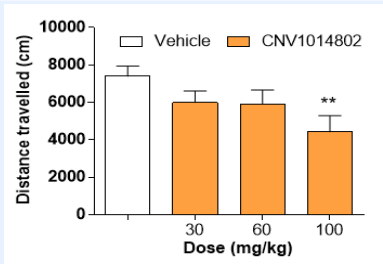
BIIB074 (CNV1014802)	BL-017881

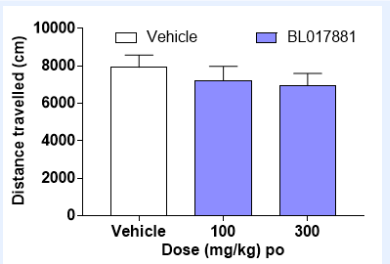
Efficacy Measured in the Mouse Formalin Paw Assay





Safety Measured in the Mouse Open Field (Dark)





Global License and Collaboration Agreement with Merck & Co in Cognition Provides Ongoing Validation

- Validates ionX and MultiCore drug discovery platforms, with ongoing discussions on new programs
- Partnership with Merck & Co in cognition generated US$20M in upfront payment in 2014, research funding 2014-2017 and US$10M first clinical milestone in February 2017
- Deal valued up to US$506M in upfront, research and milestone payments plus additional royalties on net sales of licensed drugs
- Merck continues to conduct clinical development to evaluate the asset. We plan to update the market as and when more information is available.

- Agreement covers research on BNC375 and related compounds
- BNC375 demonstrated potent memory enhancing properties in animal models – both episodic and working memory improved
- Targeting cognitive impairment in Alzheimer's and Parkinson's and other conditions

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Bionomics Oncology Assets

PRECLINICAL | Phase I | Phase II | Phase III

BNC105

Solid Cancers

- *Renal: Phase II completed, Biomarker based Phase II and Phase III ready*
- *Mesothelioma: Phase II completed*
- *Ovarian: Phase I completed, Phase II ready*
- *Colorectal (CRC): Investigator Initiated Phase II Trial , Australia*
  BNC105 in combination with Nivolumab - commenced
- *Melanoma: Investigator Initiated Phase I/IIa Trial, Australia*
  BNC105 in combination with Pembrolizumab - to commence

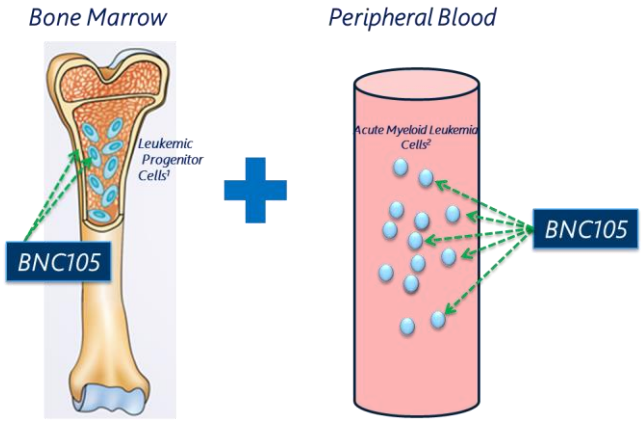
Blood Cancers

- *Chronic Lymphocytic Leukemia : Investigator Initiated Phase I Trial, USA*
  BNC105 in combination with Ibrutinib - commenced
- *Acute Myeloid Leukemia: Preclinical*
  Phase I/II ready

BNC101

Solid Cancers

- *Colorectal: Phase I completed (naked antibody, single agent)*
  Phase II ready
- *Pancreatic: BNC101 in combination with SOC*
  Preclinical
- *Antibody Drug Conjugate: Preclinical*
- *CRC: BNC101 in combination with anti-PD-1*
  Preclinical



1- BNC105 kills the leukemic progenitor cells potentially reducing recurrence of the leukemia
2-BNC105 induces activation of death proteins in AML cells in the circulation resulting in a direct cell kill

AML represents a rapid development path for BNC105

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Bionomics Outlook

- BNC210 is back on track with a solid dose formulation to achieve the blood exposure required for future PTSD trials, positive feedback from the FDA and Fast track designation providing a promising opportunity for the company in 2020 and beyond
- We continue to pursue licensing and partnering possibilities for our CNS pain and cognition programs and legacy oncology assets and have an ongoing collaboration with Merck & Co (known as MSD outside the United States and Canada)
- Bionomics continues to adapt its strategy, leadership, capital structure and cost base dynamically in response to clinical data and market conditions which has positioned us to optimise shareholder value under all foreseeable outcomes of forthcoming key inflection points
- This includes creating the potential to retire some or all of our debt during FY2020, formulating the best options for funding a second Phase 2 PTSD Trial and improving the Company's resilience and protecting shareholder value against unforeseen downside scenarios

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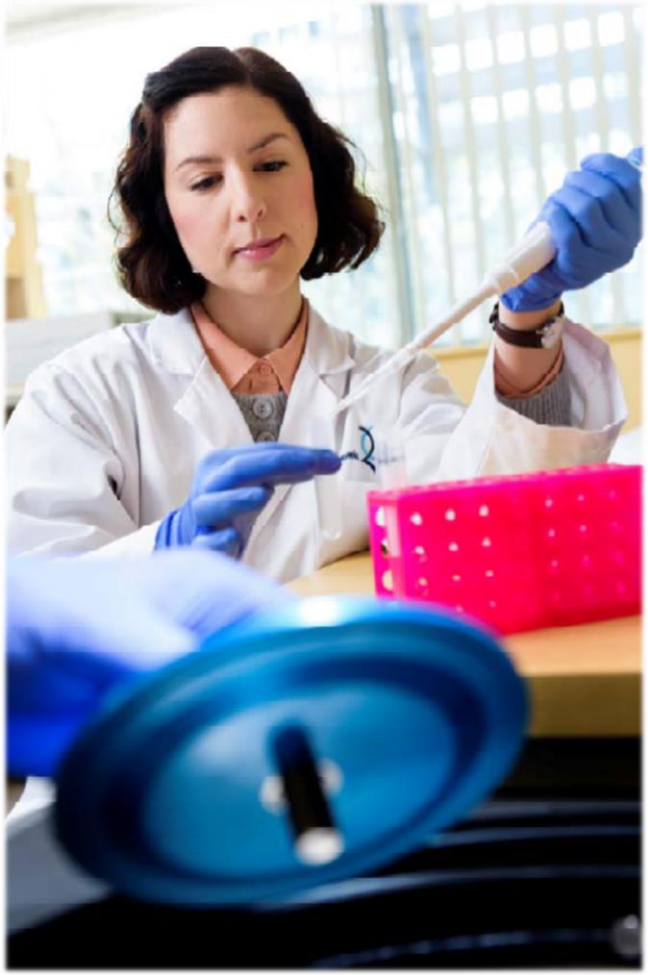
Thank You for your Continued Support in 2019



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