



Pharmaceutical Company of



# Proprietary IHL-216A for Concussion/Traumatic Brain Injury ('TBI') and CTE

A potential Candidate for FDA 505 (b)(2)  
Accelerated Drug Approval, *submission to be  
made subject to successful clinical assessments*

Expert Opinion from Camargo Pharmaceutical  
Services and Dr Sud Agarwal



# Independent Strategic Assessment Report

- IHL commissioned Camargo Pharmaceuticals Services ('Camargo') to provide an independent strategic assessment report on the FDA approval pathway for cannabinoid IHL-216A for the treatment of secondary brain injuries associated with TBI and concussion
- Camargo is an expert FDA advisory having advised upon more than 250 successful FDA applications over 17 years
- Camargo affirmed ability to make 505(b)(2) FDA submission for IHL-216A, reducing time and cost to commercialisation, subject to successful clinical assessment
- Plan to bring a registered drug to prescription market within 3 years; potential for unregistered sales sooner
- TBI is a serious and life-threatening condition over which IHL-216A addresses an unmet medical need, facilitating a potential pathway for FDA expedited review programs



ersonal use only

# IHL-216A – intended to be a first in line defence against head trauma globally

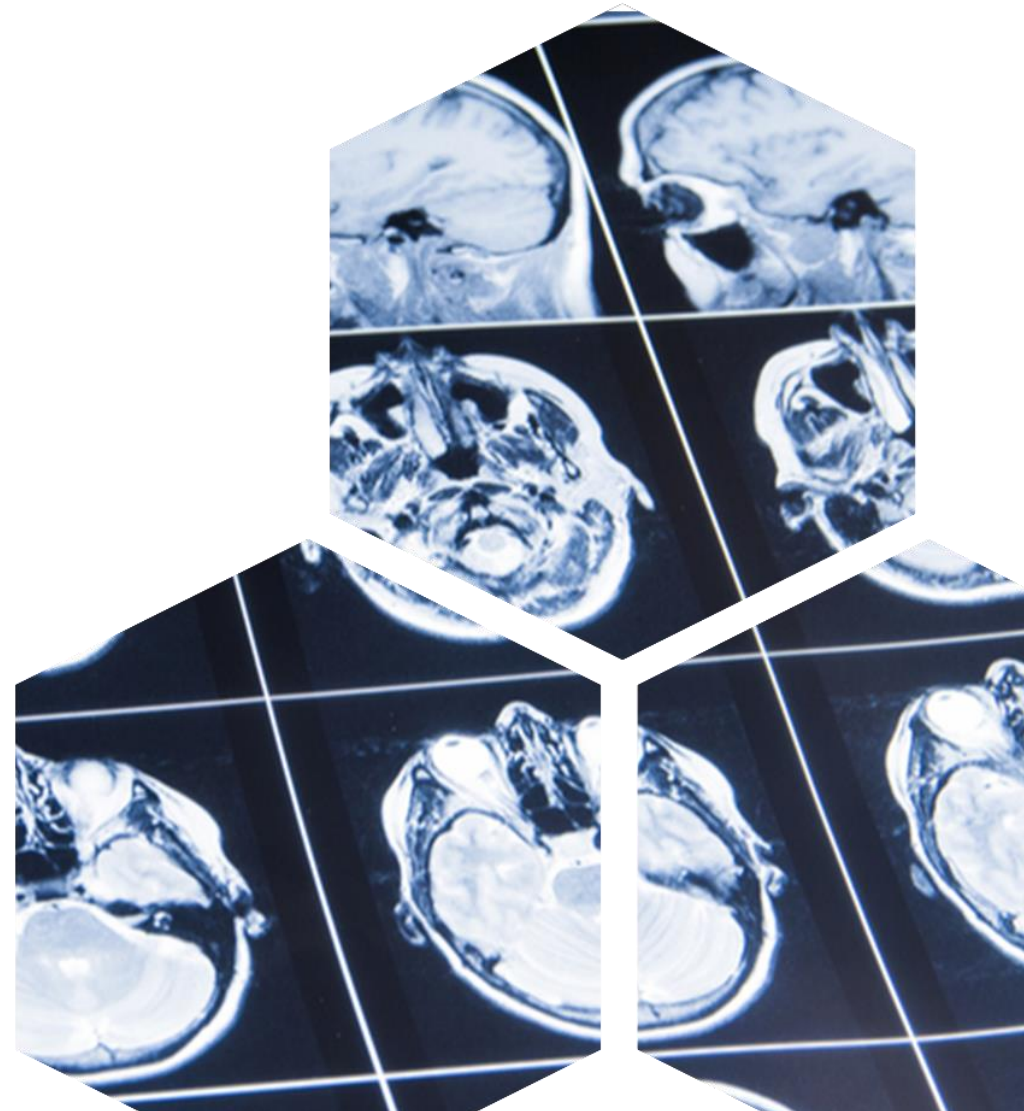
- IHL-216A is being assessed for its ability to protect the brain against the injury mechanisms that cause cell death and other negative consequences in the weeks and months following all incidences of head trauma
- TBI accounts for approximately 10 million deaths and/or hospitalisations annually in the world (Schuman et al., 2017)
- There are currently no FDA/TGA approved pharmaceutical agents (drugs) approved for its treatment
- Most common events causing TBI include:
  - Falls from ladders or down stairs
  - Vehicle related collisions (drivers, pedestrians and cyclists)
  - Sports injuries
  - Violence and crime
  - Combat injuries





# IHL-216 designed to ablate secondary brain injuries that lead to neurological deficits

- Primary injury events encompass the mechanical damage that occur at the time of trauma
- Secondary brain injuries evolve over minutes, days and even months after the primary insult and result from biochemical, metabolic and cellular changes initiated by the primary event
- Secondary injury cascades are thought to account for the development of many of the neurological deficits observed after TBI, and their delayed nature suggests that there is a therapeutic window for treatment to prevent progressive tissue damage and improve patient outcomes (Loane and Faden, 2010).
- IHL-216A theorised to be administered in the immediate period after primary injury to prevent development of brain injuries
- Ablating secondary TBI injuries potentially has positive ramifications for long term conditions, including chronic traumatic encephalopathy ('CTE'), a major health risk associated with contact sports e.g. MMA, NFL, AFL and NRL.



ersonal use only

# Neurological deficits associated with TBI and concussion

- There are many debilitating problems resulting from TBI and concussion:
  - Cognitive; memory, learning, reasoning, judgement, attention-span
  - Executive functioning; planning, decision making, multi-tasking, problem solving
  - Social; conversational difficulties, confusion
  - Behavioural; self control, risky behaviour
  - Emotional; anxiety, depression, moodiness, anger, insomnia
  - Sensory; dizziness, ringing in ears, impaired vision, impaired smell, poor hand-to-eye coordination
- Degenerative brain diseases; dementia and CTE (associated with contact sports)
- Post concussion syndrome
- Post traumatic epilepsy
- Headaches and nausea
- Vertigo



ersonal use only

# IHL-216A Indicative Clinical Program



## **Q2 CY2020 - Animal Studies**

**4-arm animal study in rodents following induced head trauma**



## **Q3 CY2020 – Phase 2b Clinical Trial**

**Study in up to 50 MMA fighters to commence once COVID-19 related restrictions have been relaxed\***



## **Q1 CY2021 – Phase 2 Dose Finding Study**

**Optimal dose finding study**



## **CY2022 – Phase 3 Clinical Trial**

- Animal studies to provide important data and will investigate synergistic action between cannabidiol ('CBD') and halogenated volatile anaesthetic agents
- CBD, under the brand name Epidiolex, has been registered for Dravet syndrome and halogenated volatile anaesthetic agents have been approved for use by FDA, facilitating IHL's decision to utilise the 505(b)(2) accelerated FDA New Drug Approval program
- IHL anticipates that Phase 1 clinical trials will only be required should the Phase 2b clinical trial find that API dosages in IHL-216A should exceed dosages observed in existing publicly available data recognised by the FDA

*\*Note: COVID-19 social distancing regulations have delayed the expected time to commence the phase 2b clinical assessment. The Company wishes to outline that social distancing measures are not expected to delay the clinical assessment of IHL-42X for OSA because the initial phase 2b clinical trial is undertaken using polysomnography equipment trial participants can use at home.*

# IHL-216A Animal Studies

- 4-arm study in 60 rodents
- Undertaken to confirm existing understanding of secondary injury mechanisms
- Superior results in combination of CBD and halogenated volatile anaesthetic agents would provide 'proof of concept' and will confirm the provisional patent, facilitating procession to patent application
- Animal studies provide important supportive data, from behavioural tests, magnetic resonance imaging and biomarkers associated with secondary injury cascades postmortem

## Study Outline

Project Title	Efficacy Evaluation of a Combined Therapy in CCI Rat TBI Model	
Compliance	Non-GLP	
Test articles	CBD and isoflurane [IHL-216A]	
Vehicle	N/A	
Controls	Negative: placebo Positive: N/A	
Research System	Species	SD rats
	Gender	24 male and 24 female
	Age	10-week-old, 220-250 g
	Number	60 in total (12 for backup)

Group	Treatment	Route of Admin.	Frequency	Animals	
				F	M
1	Placebo/Placebo	Inhaled	BID, for 7 days; 1 <sup>st</sup> dose at 15-30 minutes post injury	6	6
2	CBD/Placebo			6	6
3	Placebo/Isoflurane			6	6
4	CBD/Isoflurane			6	6

Assessments	
General observations	<ul style="list-style-type: none"> <li>- Clinical signs, adverse reactions, mortality, etc.: Daily</li> <li>- Body weight: 2x weekly</li> </ul>
Behaviour tests	<ul style="list-style-type: none"> <li>- Morris water maze: 5 days training and tests on Day 7</li> <li>- Elevated plus-maze: Day 3 and Day 7</li> <li>- Motor: Rotarod test: Day 3 and Day 7</li> </ul>
Imaging	<ul style="list-style-type: none"> <li>- MRI: Day 7</li> </ul>
Biomarker	<ul style="list-style-type: none"> <li>- Immunofluorescence: GFAP, TNF-<math>\alpha</math>, UCH-L1, IL-1<math>\beta</math></li> </ul>



## Phase 2b Clinical Trial in MMA Fighters

- Clinical trial participants are MMA fighters who receive head knocks and show symptoms of TBI and concussion
- Trial will investigate neurocognitive function in up to 50 participants that have sustained a concussion, comparing those that receive IHL-216A to those that receive a placebo
- Concussions will be diagnosed and ranked with the aid of the FitGuard concussive measuring smart mouthguard and FDA recognised neurocognitive and neuroradiological tests
- Neurocognitive tests cover aspects of cognition including attention, memory, language, reaction time and perception. Each fighter will complete baseline neurocognitive tests that will be repeated at various junctures post trauma to compare the IHL-216A and placebo cohorts
- Along with measuring duration to recovery (“return to play”), endpoints will include an array of brain-injury related blood biomarkers



# Unregistered Sales Prior to Registration


- Sales achievable prior to FDA registration and after clinical justification following initial Phase 2b clinical trial, subject to clinical success
- Unregistered sales may be achievable the via Special Access Scheme ('SAS') in Australia and through dispensaries in United States, Canada and other jurisdictions
- The SAS is a TGA pathway available to access 'unapproved' therapeutic goods. The application requires a clinical justification for the use of the product.
- Registration will facilitate prescription by all doctors, physician marketing and access of public reimbursement bodies, e.g. PBS in Australia
- IHL-216A is designed to satisfy World Antidoping Authority ('WADA') and Australian Anti-Doping Authority's ('ASADA') specifications for use by elite athletes at risk of TBI and CTE



ersonal use only

ersonal use only

## *'Expedited Review Programs' – Camargo Expert Advice*

- TBI is a serious and life-threatening condition over which IHL-216A addresses an unmet medical need
  - There is no pharmaceutical (drug) treatment approved for TBI in any jurisdiction. Current treatment for severe TBI includes decompressive craniotomy, a highly-invasive procedure to drill into the skull to drain fluid
  - Therefore, IHL-216A may be a candidate for one or more of the FDA expedited review programs, to be submitted subject to a successful Phase 2b trial:
    - Breakthrough designation
    - Accelerated approval
    - Priority review
    - Fast-track
  - FDA expedited review programs further hasten the drug review process, reducing the time to commercialisation
- 

# IHL-216A – Clinical Rationale

- CBD exhibits a broad spectrum of potential therapeutic properties, including neuroprotective effects in TBI (Shohami et al., 2011; Schurman and Lichtman, 2017)
- Through a multi-target mechanism, CBD shows potent anti-inflammatory and anti-oxidant properties, previously demonstrated in acute episodes of brain damage (Hayakawa et al., 2007; Castillo et al., 2010; Hayakawa et al., 2010)
- BM Nguyen (2014) discovered that patients who presented to a trauma centre who screened positive for cannabis had better survival outcomes than those who did not
- In 2012 a randomized double blinded placebo-controlled phase II study was published in patients who were comatose as a result of severe TBI. This trial of 97 patients showed treatment with KN 38-7271 cannabinoid improved 1-month survival in these patients (Firsching et.al., 2012)
- The Impression drug discovery team hypothesise that there is an optimal fixed dose of APIs within IHL-216A which, given soon after head trauma, will reduce:
  - Neuro-excitation
  - Neuro-inflammation
  - Cerebral Blood Flow
  - Cerebral Oxygen Consumption
- The intention is the achievement of neuroprotection, defined as reduced neuronal cell death and damage. Co-administration of CBD with a halogenated volatile anaesthetic agent is thought to create synergism whereby the concentrations of both agents can be reduced significantly whilst achieving efficacy





*The release of this announcement has been approved by the Board of Directors of IHL.*

*For further details on the announcement, interested parties should contact:*

**Mr Joel Latham**

*Chief Executive Officer and MD*

Mobile: 0409 840 786

[joel@impression.healthcare](mailto:joel@impression.healthcare)

**Dr Sud Agarwal**

*Chief Medical Officer*

[sud@impression.healthcare](mailto:sud@impression.healthcare)

*Impression Healthcare Limited  
ACN 096 635 246  
3 Fir Street  
Dingley Village, VIC 3172*

# Disclosure and Disclaimer

Not an offer of Securities This document has been independently prepared by Impression Healthcare Limited (Impression) and is provided for informational purposes only. This document does not constitute or contain an offer, invitation, solicitation or recommendation with respect to the purchase or sale of any security in Impression. This document does not constitute an offer to sell, or a solicitation of an offer to buy, any securities in any jurisdiction (in particular, the United States), or a securities recommendation. This document is not a prospectus, product disclosure statement or other offering document under Australian law or any other law and will not be lodged with the ASIC. Summary Information This document contains a summary of information about Impression and its activities that is current as at the date of this document.

The information in this document is general in nature and does not purport to be complete or to contain all the information which a prospective investor may require in evaluating a possible investment in Impression or that would be required in a prospectus or a product disclosure statement prepared in accordance with the Corporations Act 2001 (Cth) (Corporations Act). No Liability The information contained in this document has been prepared in good faith by Impression, however no guarantee representation or warranty expressed or implied is or will be made by any person (including Impression and its affiliates and their directors, officers, employees, associates, advisers and agents) as to the accuracy, reliability, correctness, completeness or adequacy of any statements, estimates, options, conclusions or other information contained in this document. To the maximum extent permitted by law, Impression and its affiliates and their directors, officers employees, associates, advisers and agents each expressly disclaims any and all liability, including, without limitation, any liability arising out of fault or negligence, for any loss arising from the use of or reliance on information contained in this document including representations or warranties or in relation to the accuracy or completeness of the information, statements, opinions, forecasts, reports or other matters, express or implied, contained in, arising out of or derived from, or for omissions from, this document including, without limitation, any financial information, any estimates or projections and any other financial information derived therefrom. Statements in this document are made only as of the date of this document unless otherwise stated and the information in this document remains subject to change without notice. No responsibility or liability is assumed by Impression or any of its affiliates for updating Not Financial Product Advice This document does not it constitute financial product advice or take into account your investment objectives, taxation situation, financial situation or needs. This document consists purely of factual information and does not involve or imply a recommendation of a statement of opinion in respect of whether to buy, sell or hold a financial product. An investment in Impression is considered to be speculative in nature. Before making any investment decision in connection with any acquisition of securities, investors should consult their own legal, tax and/or financial advisers in relation to the information in, and action taken on the basis of, this document. Information in this Document is Confidential This document and the information contained within it are strictly confidential and are intended for the exclusive benefit of the persons to whom it is given. It may not be reproduced, disseminated, quoted or referred to, in whole or in part, without the express consent of Impression. By receiving this document, you agree to keep the information confidential, not to disclose any of the information contained in this document to any other person and not to copy, use, publish, record or reproduce the information in this document without the prior written consent of Impression, which may be withheld in its absolute discretion. Acceptance By attending an investor presentation or briefing, or accepting, accessing or reviewing this document you acknowledge and agree to the "Disclaimer" as set any information in this document or to inform any recipient of any new or more accurate information or any errors or mis-descriptions of which Impression and any of its affiliates or advisers may become aware. Forward Looking Statements Certain information in this document refers to the intentions of Impression, but these are not intended to be forecasts, forward looking statements or statements about the future matters for the purposes of the Corporations Act or any other applicable law. The occurrence of the events in the future are subject to risk, uncertainties and other actions that may cause Impression's actual results, performance or achievements to differ from those referred to in this document. Accordingly Impression and its affiliates and their directors, officers, employees and agents do not give any assurance or guarantee that the occurrence of these events referred to in the document will actually occur as contemplated. Statements contained in this document, including but not limited to those regarding the possible or assumed future costs, performance, dividends, returns, revenue, exchange rates, potential growth of Impression, industry growth or other projections and any estimated company earnings are or may be forward looking statements. Forward-looking statements can generally be identified by the use of words such as 'project', 'foresee', 'plan', 'expect', 'aim', 'intend', 'anticipate', 'believe', 'estimate', 'may', 'should', 'will' or similar expressions. These statements relate to future events and expectations and as such involve known and unknown risks and significant uncertainties, many of which are outside the control of Impression. Actual results, performance, actions and developments of Impression may differ materially from those expressed or implied by the forward-looking statements in this document. Such forward-looking statements speak only as of the date of this document. There can be no assurance that actual outcomes will not differ materially from these statements. To the maximum extent permitted by law, Impression and any of its affiliates and their directors, officers, employees, agents, associates and advisers: • disclaim any obligations or undertaking to release any updates or revisions to the information to reflect any change in expectations or assumptions; • do not make any representation or warranty, express or implied, as to the accuracy, reliability or completeness of the information in this document, or likelihood of fulfilment of any forward-looking statement or any event or results expressed or implied in any forward-looking statement; and • disclaim all responsibility and liability for these forward-looking statements (including, without limitation, liability for negligence).