

Carocell Bio

Developing Novel Therapeutics for Atopic Dermatitis
and other Inflammatory Diseases

Dr Mike Davies
CEO & Founder

Carocell Bio Investment

- Seeking **£1.085 million** new investment to:
 - demonstrate that our lead atopic dermatitis compound (JEL0305) works in human biopsy tissue
 - identify the optimal JEL0305 product formulation and preparation for clinical use
 - expand the patent portfolio
 - define market access and commercial strategy for JEL0305
- Innovate UK grant £390,874 for inflammation in burns - funding received July 2020
- Patents granted in EU, US and Japan
- Current Valuation: £4,116,400
- SEIS/EIS eligible (pre-approved)
- Possible exit opportunities in Years 3 and 5

The Problem

- **Atopic Dermatitis (AD) accounts for 6% of the total inflammatory disease market**
 - 15%-20% children and 1%-3% of adults worldwide (*Nutten S, 2015; Eichenfield LF et al, 2014*)
 - “mothers hate putting steroids on baby’s face” (*personal comment Prof. Donald Leung*)
- **Current treatments are ineffective or have significant problems, for example:**
 - First line – topical ointments and creams – contain no medication
 - Second line – topical steroids – toxic and unsuitable for treatment of longer than 30 days
 - Third line – topical calcineurin inhibitors – “black boxed” in USA

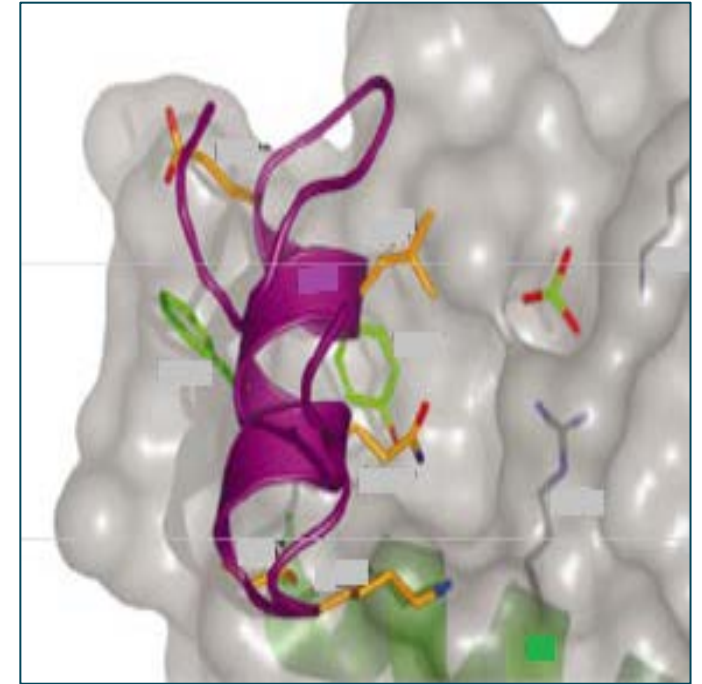
Carocell Bio's Solution

- **Effective**

- Validated target – MAP kinase
- Novel peptide inhibitors
- Novel mechanism of action
 - *Switch off inflammation* **AND**
 - *Prevent the activation of inflammation*
- Proven, safe nanoparticle delivery technology with inherent antimicrobial and skin delivery properties

- **Safe**

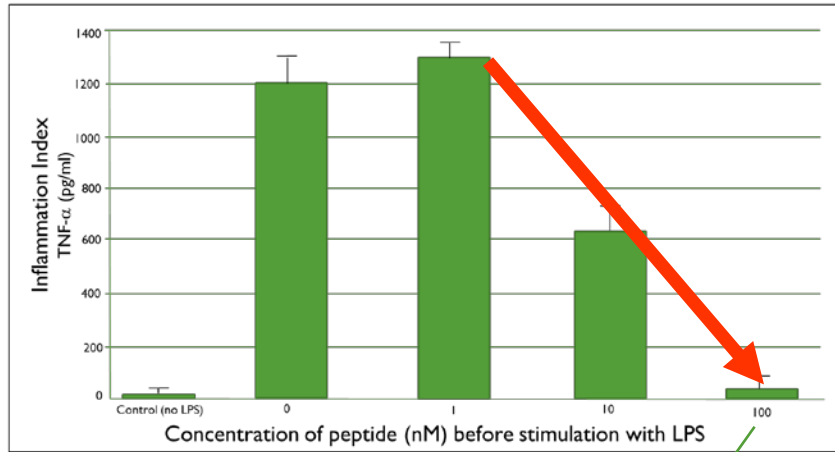
- Broken down rapidly into naturally occurring amino acids
- Only work at site of application



JEL0305 bound to p38a MAP kinase

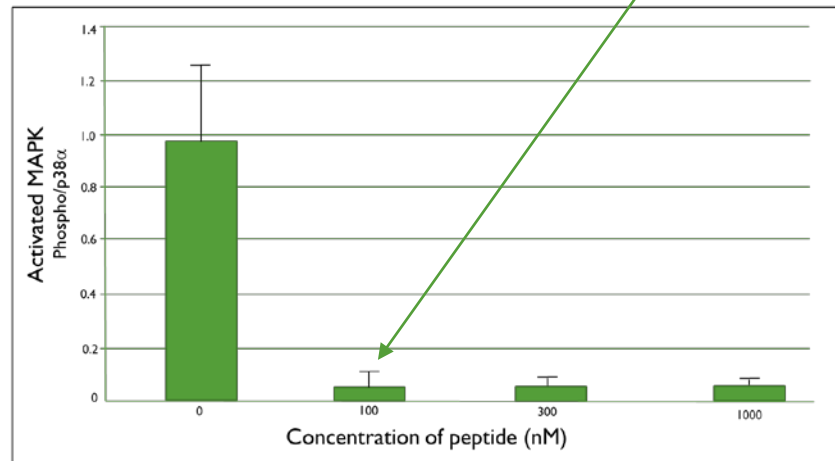
Supportive Data

Significantly reduces inflammation

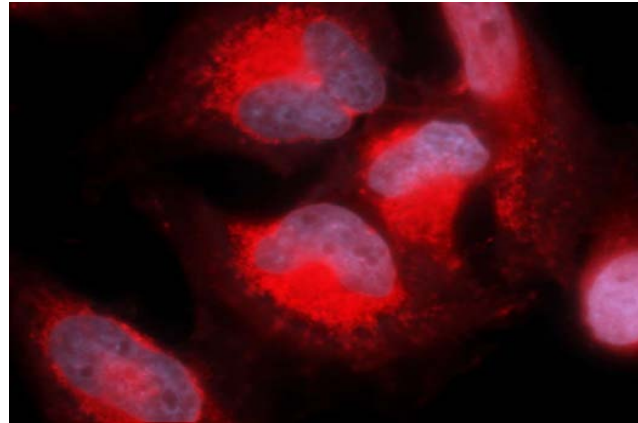


LPS, lipopolysaccharide as a simulant of inflammation; TNF, tumor necrosis factor as a marker of inflammation

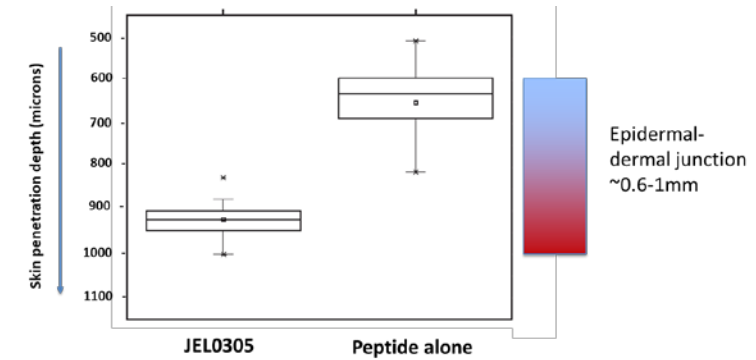
Prevention of activation of MAPK



Delivery into human cells



Delivery into the skin



Highly selective kinase inhibition

JnnK	Cdk2	Prak	Chk1	EGF	Src	Fak	Mek	Akt
>10	>10	>10	>10	>10	>10	>10	>10	~10
Kdr	Jak3	Egfr	ZAP70	CSK	IGFR	p38β	p38α	
7	7	4	4	3	0.95	0.450	0.003	

Kinase inhibition (uM)

Carocell Bio's IP

- Strong
- Long-life
- Worldwide
 - US: [US10293024](#), Granted 21st May 2019
 - Japan: [JP6566947](#), Granted 9th August 2019
 - EU: [EP3033094](#), Granted 6th November 2019
 - China: [CN105705158](#) (Pending)
- Milestone and Royalty payments to Blueberry start with Phase 2
 - clinical proof of concept

Carocell Bio

- Founded 2017 to develop AstraZeneca (AZ) peptides
- Exclusive worldwide license agreement with Blueberry
- Milestones and Royalties
- “We pay Blueberry, they pay AZ and Tecrea”
- Option to buy the patents later

Blueberry Therapeutics

- Founded 2011 to develop AZ peptides
- 2012 worldwide exclusive license with Tecrea
- 2013 Patent application process for peptides started
- **2013 Change in focus to reformulation of old drugs**
- 2013 Developing nanoparticle delivered terbinafine for onychomycosis
- **No further work on peptides**

AstraZeneca

- Developed peptides as scaffolds for small molecules
- Small molecules worked but were toxic in Phase 2
- Development STOPPED
- Project CLOSED 2010

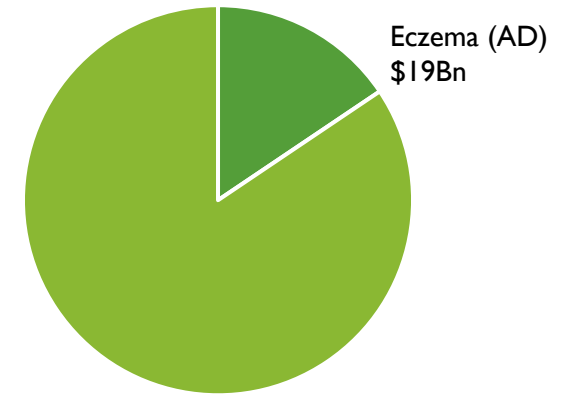
Tecrea

- Founded 2012 as spin-out of RVC
- Developed Nanocin-PRO to deliver peptides
- Patent [WO2013054123](#)

Carocell Bio Market & Competition

- **Attractive Atopic Dermatitis (AD) Market**
 - First indication
 - \$19 billion market
- **Many competitors/potential collaborators for a safe and effective treatment**
 - Dermavant Sciences, Gilead Sciences, Immune Pharmaceuticals, Neovacs, Sanofi, Regeneron Pharmaceuticals
 - Continually changing

Inflammation (\$122.3Bn)



Mergers & Acquisitions in Inflammatory Disease

Appetite for M&A in life science sector continues (KPMG)
Pharma and life sciences deals totaled over \$350Bn in 2019 (PWC)
Smaller bolt-on acquisitions expected to flourish

Novartis ponies up \$310M for IFM Therapeutics' inflammation-focused unit

Novartis is handing over \$310M up front and up to \$1.265Bn in milestones.

April 2019

Janssen Biotech Offers up to \$1Bn to Theravance Biopharma for a Bowel Inflammation Drug

Theravance is getting \$100M upfront and up to an additional \$900M in payments.

February 2018

Rheos pens Roche collab for next-gen immunometabolism research for \$800M

Rheos Medicines is getting \$42.5M upfront, plus \$90M in milestones and options. Then \$660M to follow.

December 2019

[https://www.fiercebiotech.com/biotech/rheos-pens-roche-collab-for-next-gen-immunometabolism-research-](https://www.fiercebiotech.com/biotech/rheos-pens-roche-collab-for-next-gen-immunometabolism-research)
<https://www.fiercebiotech.com/biotech/novartis-ponies-up-310m-for-ifm-therapeutics-inflammation-focused-unit>
<https://www.labiotech.eu/medical/janssen-biotech-theravance-bowel-inflammation/>
<https://www.fiercepharma.com/special-report/top-10-largest-biopharma-m-a-deals-2019>
<https://www.pwc.com/us/en/industries/health-industries/library/pharma-life-sciences-quarterly-deals-insights.html>

Growth Staging

Current Valuation	Investment Stage	Investment	Activity / Outcome	Potential Exit Valuations
£4,116,400	Year 1	£1,085,000 + Innovate UK grant (£390,874)	Show activity in human AD tissue biopsies Formulation Patents expanded	---
	Year 2-3	£8M	Pre-clinical Development & Regulatory Approval for Clinical Development	>£41M*
	Year 4-5	£25-30M	Clinical Proof of Concept	>£350M*

* <https://www.fiercepharma.com/special-report/top-10-largest-biopharma-m-a-deals-2019>

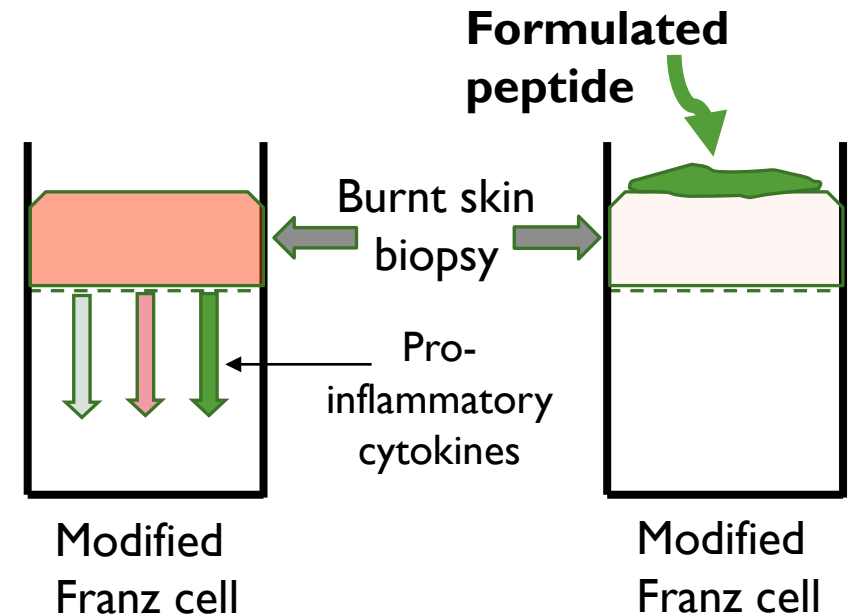
* <https://www.pwc.com/us/en/industries/health-industries/library/pharma-life-sciences-quarterly-deals-insights.html>

Year 1: Lead Peptide and Lead Formulation

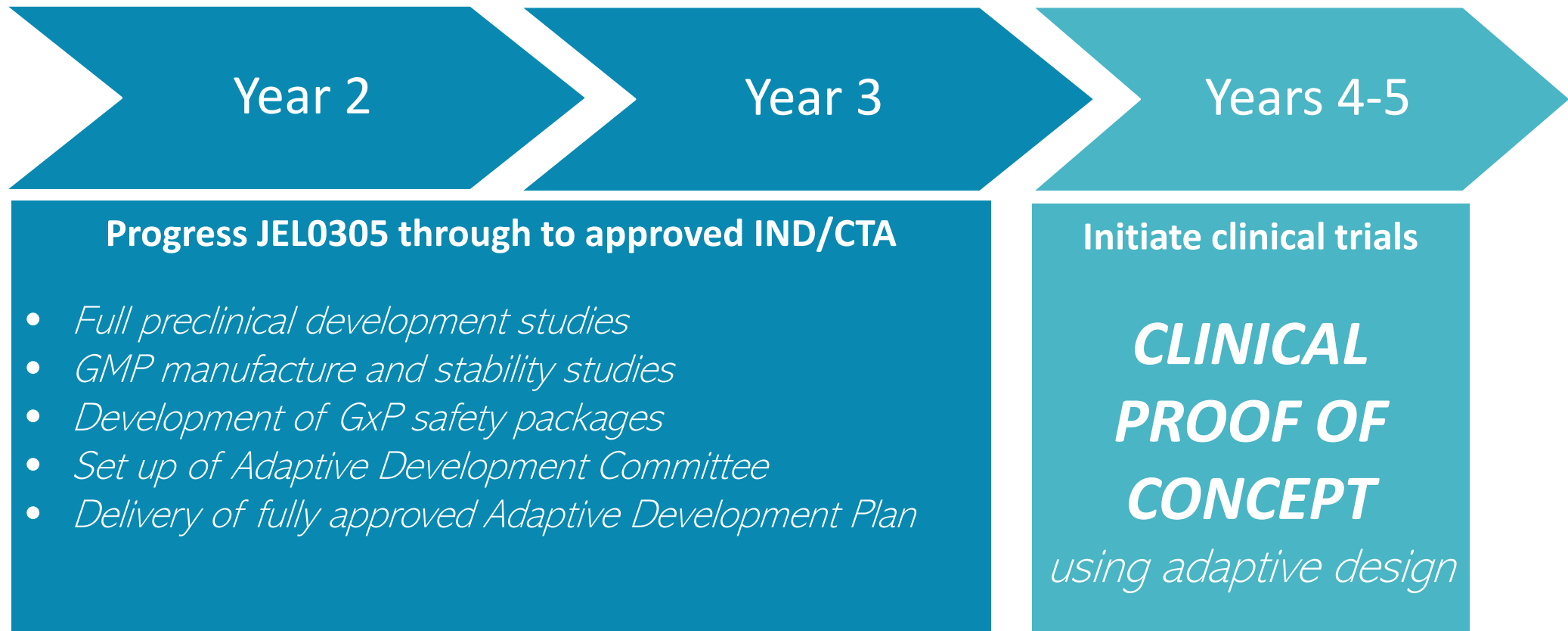
- Provide robust evidence of pre-clinical efficacy in human AD tissue biopsies using a topical approach
- Define the optimal JEL0305 product formulation
 - manufacture of peptides, testing different formulations (peptide+Nanocin) and define optimal delivery preparations e.g. cream/ointment. Efficacy and stability testing
- Expand patent portfolio
- Define the market access and commercial strategy
- Provide a 'Plan B' - investigate the properties of JEL0305 in a well-established rat model of dry eye disease (DED)

Year 1: Innovate UK grant work (burns)

- Innovate UK grant of £390,874
 - Manufacture and basic formulation of one peptide
 - Tissue assays (modified Franz cell setup)
 - Demonstrate inhibition of inflammatory response in human burn tissue biopsy
 - This work will be done in close association with Professor Fadi Issa, John Radcliffe Hospital, Oxford



Year 2-5: Pre-clinical and Clinical Development



CTA, clinical trial authorization; GMP, good manufacturing practice; GxP, good practice IND, investigational new drug

Financial Forecast: Years 1-5

Cost	Year 1 (£)	Year 2 (£)	Year 3 (£)	Year 4 (£)	Year 5 (£)	Total Years 1-5 (£)
Formulation and GMP Production	£175,000	£400,000	£1,000,000	-	-	£1,575,000
Patents and legal	£80,000	£250,000	£600,000	£500,000	£500,000	£1,930,000
Staff	£175,000	£250,000	£370,000	£500,000	£600,000	£1,895,000
Consultants	£150,000	£250,000	£250,000	£500,000	£500,000	£1,650,000
Overheads and pass-throughs	£65,000	£100,000	£124,000	£200,000	£220,000	£709,000
Laboratory costs	£236,000	£100,000	£200,000	-	-	£536,000
External resources*	£54,000	£75,000	£140,000	£150,000	£150,000	£569,000
Toxicology and safety studies		£176,206	£1,410,000	£1,000,000	£1,000,000	£3,586,206
Adaptive Development Committee		£1,033,794	£1,186,000	£500,000	£500,000	£3,219,794
Clinical Costs	£150,000	-	-	£6,237,327	£13,875,750	£20,263,077
TOTALS	£1,085,000	£2,635,000	£5,280,000	£9,587,327	£17,345,750	£35,933,077

*Consultants, external meetings, scientific advisory meetings, board meetings

Carocell Bio Executive Team

Dr Mike Davies MD, FRCRS, FRSPSG CEO & Founder



- Over 25 years' global executive leadership experience
- Developed marketed drugs for inflammatory diseases: AD (Cortef, hydrocortisone), Actinic keratosis (Aldara, imiquimod), Basal Cell Carcinoma (Aldara, imiquimod) and IBD (Mezavant/Lialda, mesalazine)
- Extensive Nanocin knowhow and experience
 - CTA & IND for onychomycosis and tinea pedis with Blueberry Therapeutics
- Expertise in taking medicines from ideation to the market
- Founded and invested £500,000 in Carocell Bio



John Nicholson Chairman



- International experience in pharma from start-ups
- Well networked for raising new monies for pharma business in UK and USA
- Raised new capital for several start-ups
- Advisory Board of North West Business Fund (£155m)
- Chairman and CEO of Gentronix Ltd to 2019



Carocell Bio Advisory Team

Professor Donald YM Leung
Scientific Advisor, AD



Professor and Head of the Division of Paediatric Allergy and Immunology, Department of Paediatrics at University of Colorado Denver School of Medicine, Denver, United States.

Professor Fadi Issa
Scientific Advisor, Burns



Consultant Plastic and Burns Surgeon, Buckinghamshire Healthcare Trust.

Nuffield Department of Surgical Sciences, University of Oxford, John Ratcliffe Hospital, Oxford.

Developing and delivering the next generation
of medicine for **Atopic Dermatitis**

Seeking **£1,085,000** over 12 months to show
JEL0305 works in human tissue biopsies and to define
the optimal product

Possible exit opportunities in Years 3 and 5