New Technologies, New Materials, New Users...

New Opportunities for Growth
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New Opportunities for Growth

1. Introduce Pharmako
2. Growth in Sports / Active Nutrition
3. Focus on our innovation
4. Recent studies
5. 2 important need states
6. Examples of innovations, including elite athlete use
Plenary Short Summary:

- “Emergent users” look beyond traditional ingredients and formats.
- Innovation brings new ingredients from outside sports nutrition to tap into the need states of both core and emergent users.
- This innovation also brings new formats to expand use through convenience and improved efficacy of nutrients.
Water vs Fat Soluble Vitamins

Water-Soluble (Hydrophilic)
- B1
- B2
- B3
- B5
- B6
- B7
- B9
- B12
- C

❖ Rapidly absorbed
❖ Not stored
❖ Excess is excreted

Fat-Soluble (Lipophilic)
- A
- D
- E
- K
- Ω-3
- Ω-6
- Ω-9

❖ Dissolve in fat
❖ Poorly absorbed
❖ Excess is stored

Therapeutic dose
We customise formulations for clients

Your ingredient / nutrient

Your preferred format

Your market
AquaCelle®
MICELLAR TECHNOLOGY

CWDs
Self Micro-Emulsifying Delivery Systems using AquaCelle®

SMEs
Compressible Powdered Oils using AquaCelle®

CPOs
Cold Water Dispersible Powders using LipiSperse®

CWDs
LipiSperse®
DISPERSION TECHNOLOGY
... in any dosage format
Product development adapts to broader “fitness” universe

- Sports nutrition brands are tweaking their portfolios to appeal to average, health-conscious consumers
- Through blended drinks, high-protein juices, snacking options, etc.
- Through mass-facing packaging and product positioning
- Competitive universe is shrinking as sports nutrition creeps closer toward broader health and wellness

Euromonitor 2018
Convenience is key, making it accessible

Product Timing
- Pre-Workout 13.8%
- Intra-Workout 12.2%
- Post-Workout 6.0%
- Pre&Post-Workout 22.6%
- Any Time 44.3%

Product Format
- Soluble Powder 66.5%
- Capsule 18.9%
- Tablet 11.0%
- Candy 0.3%

Product breakdowns, World, Q3 2018

Tom Morgan ANutr, Market Analyst
Lumina Intelligence, William Reed Business Media
Pharmako technologies improve nutrients:
✓ Easier to take
✓ Smaller doses
✓ More efficacy
✓ Faster acting

LEADING TO MORE USERS

= EASIER TO SELL “SOLUTIONS”
Product development adapts to broader “fitness” universe

Core Users
Fitness / Casual Users
“Active” / Lifestyle users

Competitive universe is shrinking as sports nutrition creeps closer toward broader health and wellness
What is LipiSperse®?

Novel technology, unique to nutraceuticals, active nutrition (not in pharma)
• developed in Sydney in 2017
• cold water dispersible powder
• patented technology

Advantages of utilising LipiSperse®:
• higher active loads.
• improved functionality.
• enhanced absorption.
LipiSperse®

DISPERSION TECHNOLOGY

Primary particles

Agglomerate behaving as one single large particle

Scale is the same (10 microns) in both pictures
Perfect Dispersion:
Effective Specific Surface Area Large
= ENHANCED BIOAVAILABILITY

Poor Dispersion:
Effective Specific Surface Area Small
= POOR BIOAVAILABILITY

LipiSperse®
DISPERSION TECHNOLOGY
With LipiSperse, surface tension is lowered, so water will adhere to particles. Goal is to allow water to engulf the lipophilic crystal.
LipiSperse® technology.

Repulsive forces between the particles prevent agglomeration or aggregation thereby allowing CWD Powders to have proper particle dispersion.
90% curcumin
10% LipiSperse®
<20% curcumin
>80% excipient
90% curcumin
10% LipiSperse®
Other bioavailable curcumins
Technological advantage

HydroCurc®
Pharmako’s LipiSperse® is an advanced cold water dispersion technology which allows lipophilic active ingredients with otherwise relatively low bioavailability and poor solubility in water, to be easily dispersed in cold water, thereby increasing their bioavailability and uptake in the body.

LipiSperse has been customized for: Curcumin, silymarin, boswellia, resveratrol, quercetin, PEA, coenzyme-Q$_{10}$, fisetin, dunaliella salina..

Advantages of utilising LipiSperse®:
• higher active loads.
• improved functionality.
• enhanced absorption.
What is HydroCurc®?

The world’s most bioavailable curcumin in a single dose
• potent anti-inflammatory
• cold water dispersible powder
• patented technology

Advantages of utilising LipiSperse®:
• higher active loads.
• improved functionality.
• enhanced absorption.
PEA - Mechanism of Action

Involvement of different receptors in the central and peripheral effects of PEA

1. Entourage effect
   • Indirectly increases AEA by down-regulating FAAH
     • CB1 ➔ calm/pain
     • CB2 ➔ antibodies
     • TRPV1 ➔ sleep

2. Decrease inflammation locally:
   i. PPAR-α agonist
   ii. COX-2 inhibitor
   iii. Microglial inhibitor
   iv. Inhibits mast cell degranulation
HydroCurc® Pharmacokinetic Trial

A single dose, randomised, double-blind, crossed over bioavailability study to measure uptake of curcuminoids over a 24-hour period

Male and Female (n=18). (7 crossed over)
Age 19-46 years

0 (baseline) and 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 and 24 h post supplementation.

750 mg of curcuminoids with or without LipiSperse®.
- C max: 807
- T max: 1 hr
- Total AUC: 1898 ng/ml
- P < 0.05
Levagen+™ Pharmacokinetic Trial

• A parallel, double-blind, absorption study to measure uptake of PEA over a 4-hour period.

Male (n=11) and Female (n=17)
Age 18-30 years

Blood samples were taken at baseline and 30, 45, 60, 70, 90, 120, 180, 240 minutes post supplementation.

300 mg of Palmitoylethanolamide with or without LipiSperse®.
Levagen+\textsuperscript{TM} Pharmacokinetic Trial

<table>
<thead>
<tr>
<th></th>
<th>Group 1 Levagen\textsuperscript{TM+} 300 mg</th>
<th>Group 2 Standard PEA 300 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (pmol/mL)</td>
<td>11.9 ± 4.55</td>
<td>15.2 ± 4.25</td>
</tr>
<tr>
<td>Delta C\textsubscript{max} (pmol/mL)</td>
<td>11.12*</td>
<td>7.96</td>
</tr>
<tr>
<td>Peak timing (min)</td>
<td>105</td>
<td>125</td>
</tr>
<tr>
<td>Total AUC\textsubscript{(0-4h)}</td>
<td>1,942 ± 701.1#</td>
<td>1,117 ± 485.1</td>
</tr>
</tbody>
</table>

Table 1: Plasma PEA concentrations for both groups. Total AUC is calculated on the PEA concentration change from baseline data. * – Significant compared to baseline value in the same group, # – Significant compared to standard PEA group. p < 0.05.
2 very important consumer needs

Reduces Joint pain & inflammation

Exercise Recovery

50% of all new exercise routines are abandoned within first 6 months

Otherwise: no longer following health goals, but also NOT BUYING ANY PRODUCT!
Elite athletes >>> casual fitness

Performance

Recovery
HydroCurc® Exercise Recovery Study

A single dose, randomised, double-blind, exercise recovery study
Dosed, then induced local muscle fatigue (leg press), then daily for 3 days.

Healthy males (n=28).
Average Age 26.4 years

500 mg of HydroCurc® as a 250 ml drink

Blood markers – muscle damage, energy source, molecular pathway and inflammatory markers.
Recovery – Exhaustive exercise performance test, power & velocity
Delayed onset muscle soreness
Results

Significant reduction in VAS score for pain on DOMS at 48 and 72 hours

Significant reduction in Thigh circumference at 48 and 72 hours
Results

- There was a significant decrease in lactate accumulation post-exercise, 30 minutes after consumption of a single dose of HydroCurc compared to placebo.

- Changes in inflammatory marker IL-10 was significantly higher 24 hours post exercise and IL-6 significantly different at 1, 24- and 72-hours following exercise in the HydroCurc group.
There was a significant increase in *Protein Kinase B* median fluorescence intensity from baseline to 30 mins in the HydroCurc group (*) after a *single* dose of HydroCurc.
Conclusion

• The results suggest that HydroCurc may allow for a quicker return to exercise training, or a return to exercise training at higher thresholds than placebo.

• This may be due to HydroCurc’s anti-inflammatory properties which reduce thigh circumference, pain, and modulate energy metabolism.

• HydroCurc in combination with exercise is stimulating the PKB/mTOR pathway which is responsible for muscular hypertrophy and cellular survival.
Levagen+™ Exercise Recovery Study

A single dose, randomised, double-blind, exercise recovery study
Dosed, then induced local muscle fatigue (leg press), then daily for 3 days.

Healthy males (n=28).
Ages 18 – 35 years

150 mg of Levagen+™ v placebo

1. Muscle damage blood markers - Creatine Kinase, myoglobin, lactate dehydrogenase
2. Muscle Pain – DOMS; VAS pain score
3. Exercise recovery – Number of LP completed post supplementation; Maximum LP repetition as measured by a power meter.
4. Lactate, CRP, IL-6, IL-10, TFN-α, P38
5. MSFI Multidimensional Symptoms Fatigue Inventory; KOOS specific to leg pain and McGill; pain questionnaire; Muscle swelling (measurement of thigh circumference)
Exercise Study Results

Levagen+™ group had lower blood concentration of myoglobin than placebo

Reduce muscle damage

Significantly lower lactate levels post-exercise

Sparing of anaerobic energy substrates and increased lactate threshold
Levagen Osteoarthritis Study

8 week, randomised, double blind, placebo controlled clinical study on safety and efficacy of PEA for the management of mild to moderate OA symptoms

Healthy males and females (n=120). Medically diagnosed OA (Stage 1-3)
Not using daily prescribed OA medication

300 mg of Levagen™ (150 mg b.i.d.) v 600 mg of Levagen™ (150 mg b.i.d.) placebo

WOMAC questionnaire: Pain, stiffness and function
WOMAC Pain
DAAS21 Questionnaire
Osteoarthritis Study Results

**Total WOMAC score per treatment group**

- Levagen 300mg
- Levagen 600mg
- Placebo

**WOMAC pain score per treatment group**

- Levagen 300mg
- Levagen 600mg
- Placebo

**WOMAC stiffness score per treatment group**

- Levagen 300mg
- Levagen 600mg
- Placebo

**WOMAC function score per treatment group**

- Levagen 300mg
- Levagen 600mg
- Placebo
Practical Applications

• **Pre-workout**
  – Reduce the anaerobic energy contribution to exercise allowing athletes to perform harder for longer
  – Increase activation of mTOR – resulting in improved muscular development

• **Post-workout/daily supplementation**
  – Reduce thigh circumference and accompanied fluid retention
  – Reduce delayed onset muscle soreness and improve return to sport/training time
Practical Applications

Joint pain
Joint mobility
Exercise recovery
DOMS
Reduced lactic acid build up
Potential hypertrophy – MPS stimulation
Sleep quality improvement

Better Recovery → Better Performance
New technologies... new materials...
Vitanatur Cúrcuma Collagen Sport

Vitanatur Cúrcuma Collagen Sport es un complemento alimenticio a base de cúrcuma, colágeno hidrolizado, vitaminas A, C, D y E, magnesio, selenio y zinc especialmente indicado para personas que realizan actividad física de manera frecuente e intensa.

Código nacional: 185412.4

**Presentación:**
Bote metálico con 360g de polvo y con cacito dosificador de 12g.

**Ingredientes Principales:**
Cúrcuma, colágeno hidrolizado, vitaminas (A, C, D, E) y minerales (MG, Se, Zn).

**Modo de empleo:**
Disolver 1 dosificador (12 g) en 1 vaso de agua. Tomar 1 vez al día. Se recomienda tomar durante 2-3 meses. Descansar 1 mes y repetir en caso necesario.
YOUR DAILY AMMUNITION

THE WORLD'S MOST ADVANCED, BIOAVAILABLE SUPER SUPPLEMENT, POWERED BY SCIENCE TO DELIVER ULTIMATE WELLNESS.

READ MORE  BUY NOW
BioSupplements

HydroCurc® Max

10,000mg
400mg Curcumin

Joint Health
D O M S

BIOLLOGICA AUSTRALIA NUTRITION

J O I N T S
D O M S
LipiSperse® formulations

Levagen®+ PEA Capsules
Palmitoylethanolamidine enhanced with LipiSperse®

Price: £15.95 - £26.95

Levagen®+ PEA Powder
Palmitoylethanolamidine Enhanced with LipiSperse®

Price: £23.95 - £59.95
LipiSperse® formulations

- **Coenzyme-Q$_{10}$**
  - India

- **Quercetin**
  - USA

- **HydroCurc® in Aloe**
  - New Zealand

- **Dunaliella Salina**
  - Australia
Utilized by Elite Athletes
Trialled by Elite Athletes
X-factors

Most bioavailable curcumin / alternative to CBD
Fast acting
Convenience
Range of formats
New benefits for Sports Nutrition
Low excipient load / high active load

**BETTER RECOVERY → BETTER PERFORMANCE**

POTENTIAL TO TAP INTO NEW EMERGENT USERS: GROW THE CATEGORY