

# COMMERCIALISATION OF IDP<sup>®</sup> BIOACTIVE MILK PROTEINS – A CONTINUAL JOURNEY

**ROD CLAYCOMB**



## .... A LONG JOURNEY



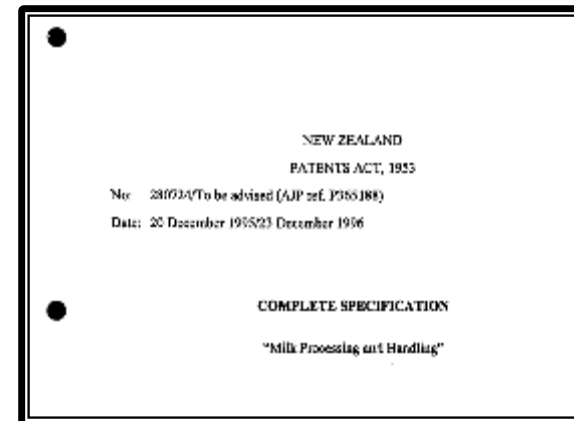
1940 1950 1960 1970 1980 1990 2000 2010

**Alex Harvey Industries (AHI)**  
- Plastics Manufacturing  
- World's First Herd Recording Milk Meter

**Carter Holt Harvey (CHH)**  
- Plastic Products Division  
- Relationship with Ruakura Research Centre  
- Growing portfolio of milking machine products

**CHH Plastic Products Growth**  
- Established Waikato Milking Systems Brand  
- Developed Eazi-Breed CIDR device for controlling oestrus  
- Expansion into US market through Dairy Express

**DEC International Incorporated**  
- Established Waikato Milking Systems Division (milking machines)  
- Established InterAg Division (CIDRs)  
  
- Bill Thompson (ex-Shell Oil) – bringing oil separation technologies to milk  
- University of Wisconsin – on-farm milk fractionation project leads to 1995 patent  
- proof-of-principle separation of lactoferrin from cow's milk using membrane technology





### DEC International (NZ) Limited

- Established R&D division in milk technology; hired Dr Rod Claycomb
- Focal points were (1) milk sensing and (2) on-farm fractionation

### Sensortec Limited

- World's first company in milk sensing
- Greenfield Project – world's first pastoral robotic milking project (partnership with NZ dairy industry)

### Milk Fractionation Project

- World's first on-farm milk fractionation robot (University of Waikato project – Prof Conan Fee and Amita Chand)

### Quantec Limited

- Established to commercialise on-farm fractionation technology

### Mid-2006

- **Discovery of unique properties of milk fraction, called IDP (Immune Defense Proteins)**
- Started working on Animal Health pharmaceutical applications; non-antibiotic, nil milk-withhold mastitis treatment

### 2009

- Drs Bragger and Claycomb bought the business from DEC
- Explored expansion into Human Health

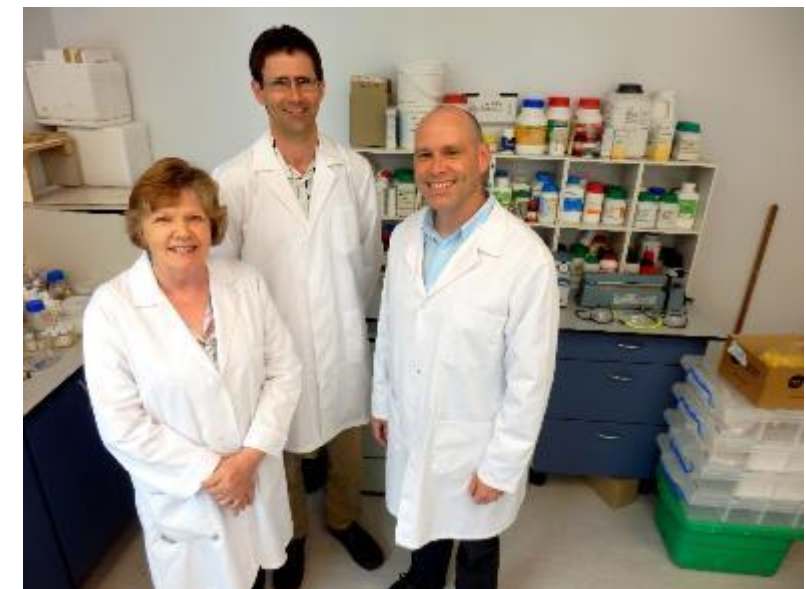
## .... AN EXPENSIVE JOURNEY





## Funding

- ▶ **Personal capital**
- ▶ **Family support**
- ▶ **Waikato Innovation Park**
- ▶ **Angel Investment (original 38% - now 69% of company)**
  - ▶ **NZVIF**
  - ▶ **Central Capital (John Birch, Neil Richardson, Earl Rattray, Mark Hickmott, Perry Investments, Julie Caddigan)**
  - ▶ **Enterprise Angels (Tauranga)**
- ▶ **Government Funding**
  - ▶ **Callaghan Innovation**
  - ▶ **New Zealand Trade & Enterprise**
  - ▶ **High Value Nutrition**
- ▶ **Government Support**
  - ▶ **New Zealand Trade & Enterprise**
- ▶ **External Capital Raises could still come**



## .... A REWARDING JOURNEY







# CORE TECHNOLOGY PLATFORM

**Quantec** Ingredients &



epiology™

milkamune

# ANTIMICROBIAL MILK PROTEINS

**Quantec** Ingredients

epiology™

**Quantec** Animal Health

# Dairy Cow

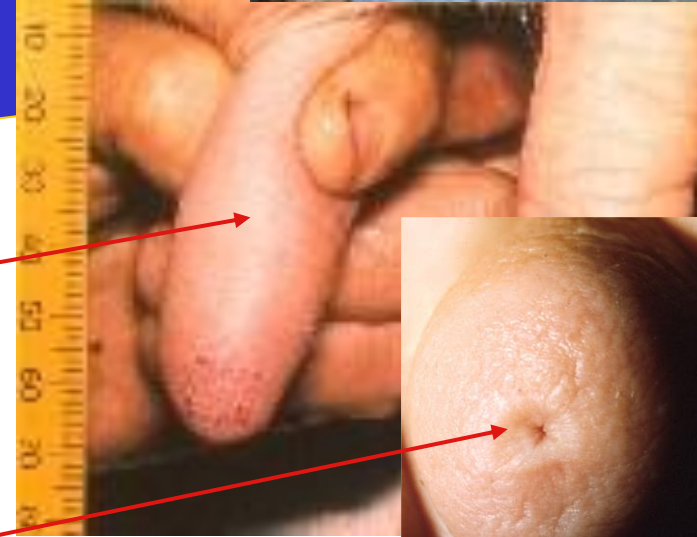
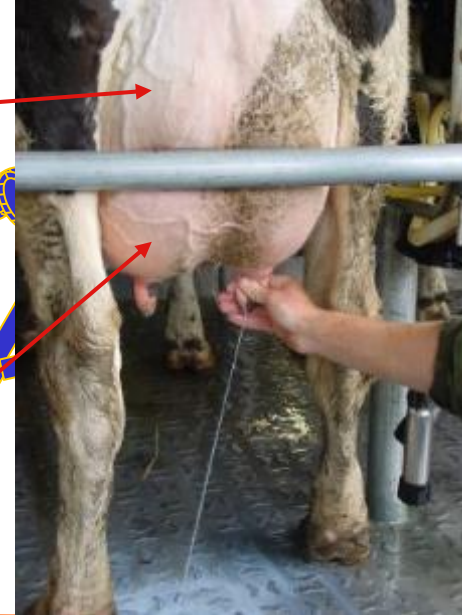
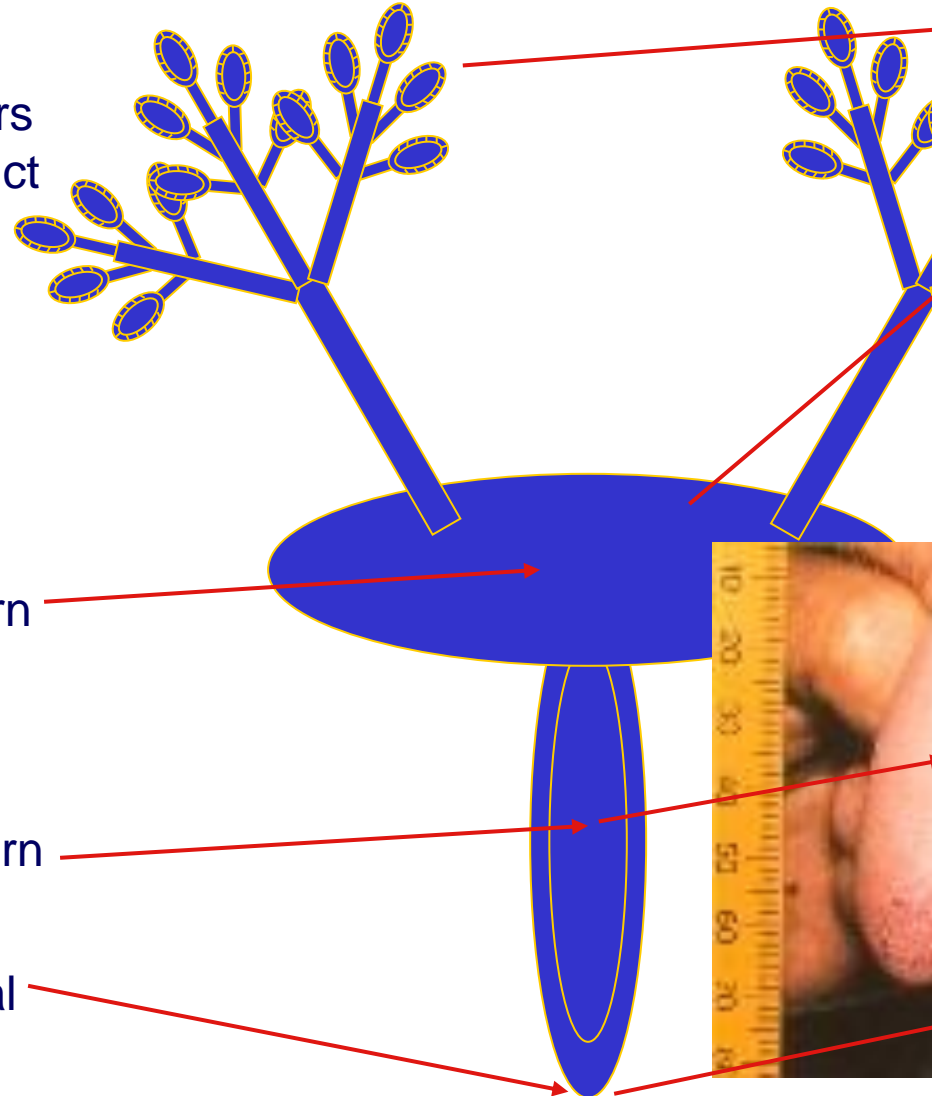




# Defense 'Engine' of the Udder

All internal surfaces lined with 'skin'

Alveolar Clusters  
Feeding into Duct  
System



Udder Cistern

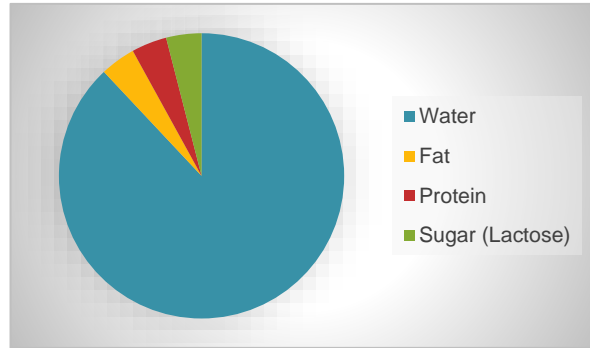
Teat Cistern

Teat Canal

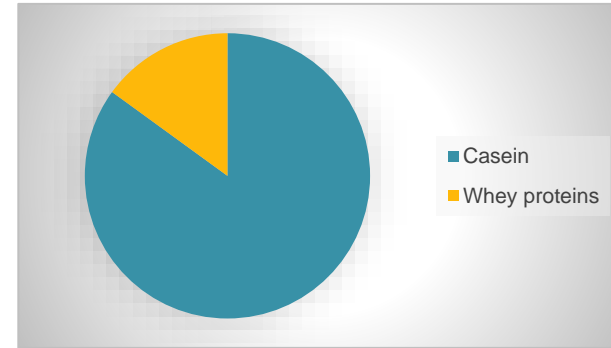


# Milk Composition

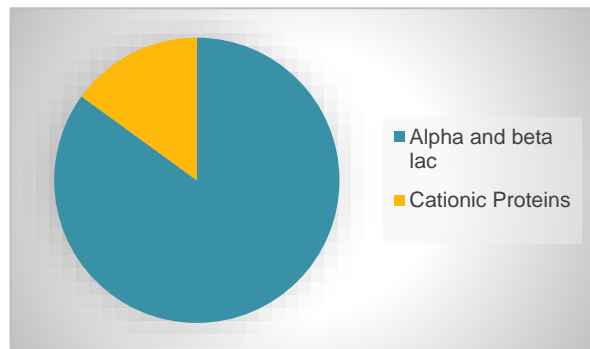
## Milk (10L)



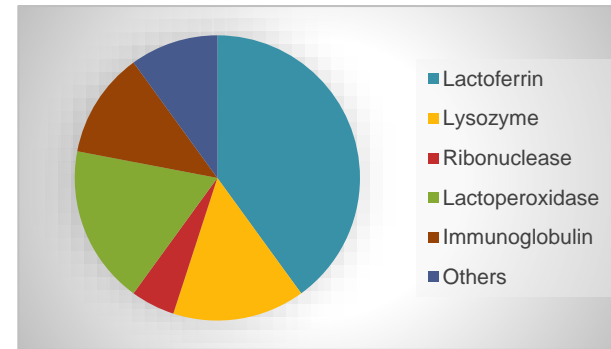
## Proteins



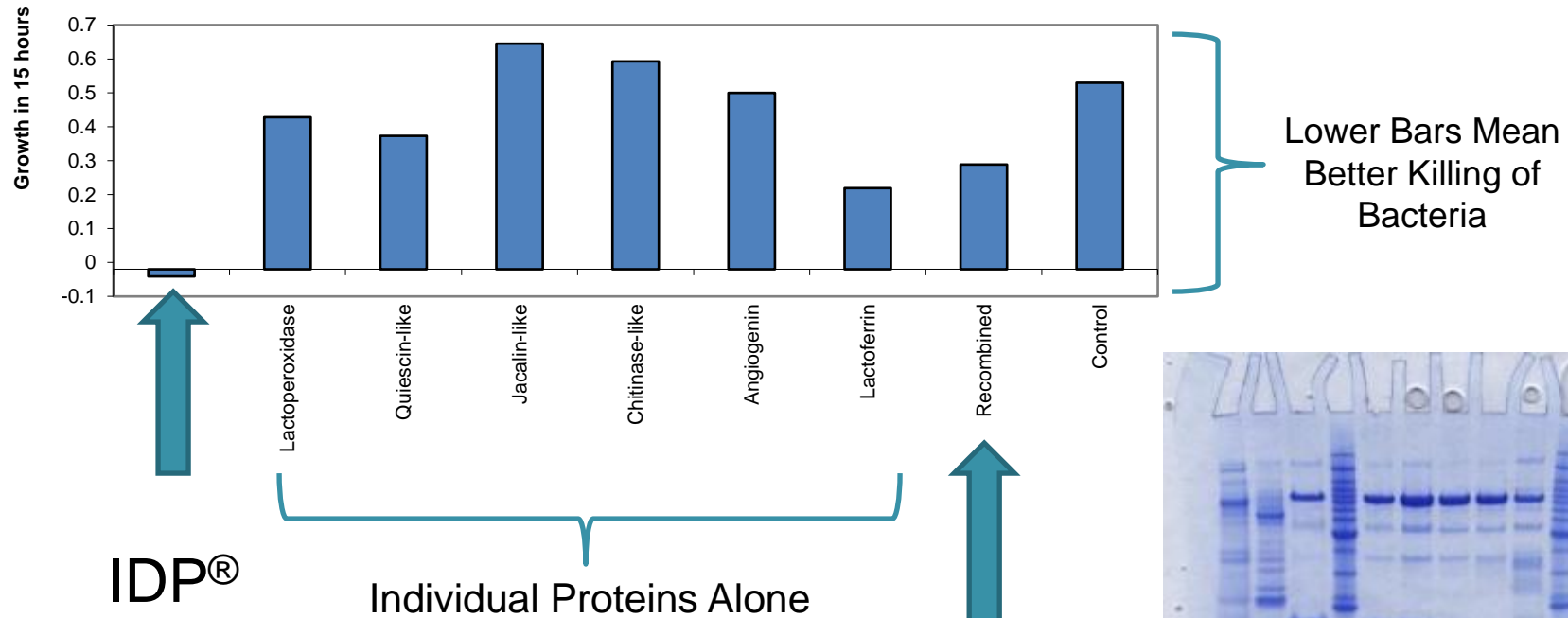
## Whey Proteins



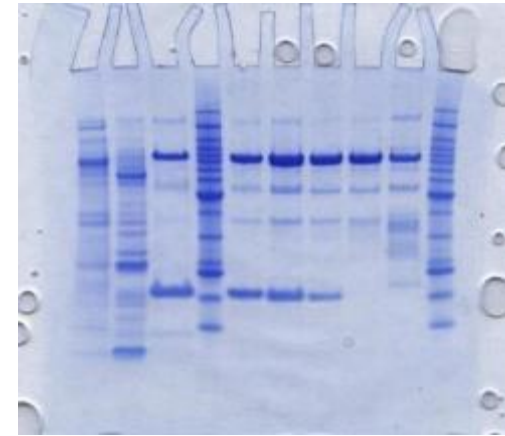
## Cationic Proteins (1g)



## *S aureus* Inhibition



Note: Simply recombining two or more purified proteins does not regain the activity.

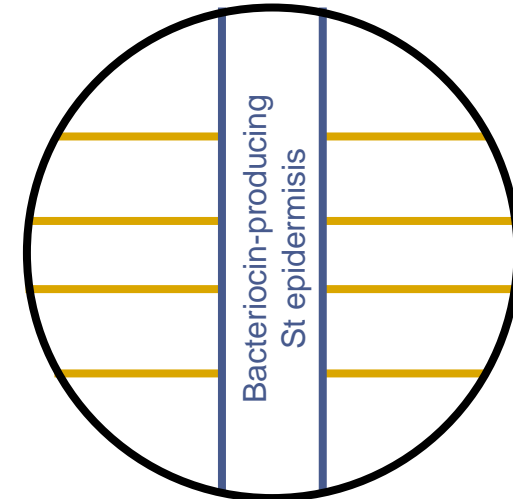




# IDP Selective Antimicrobial

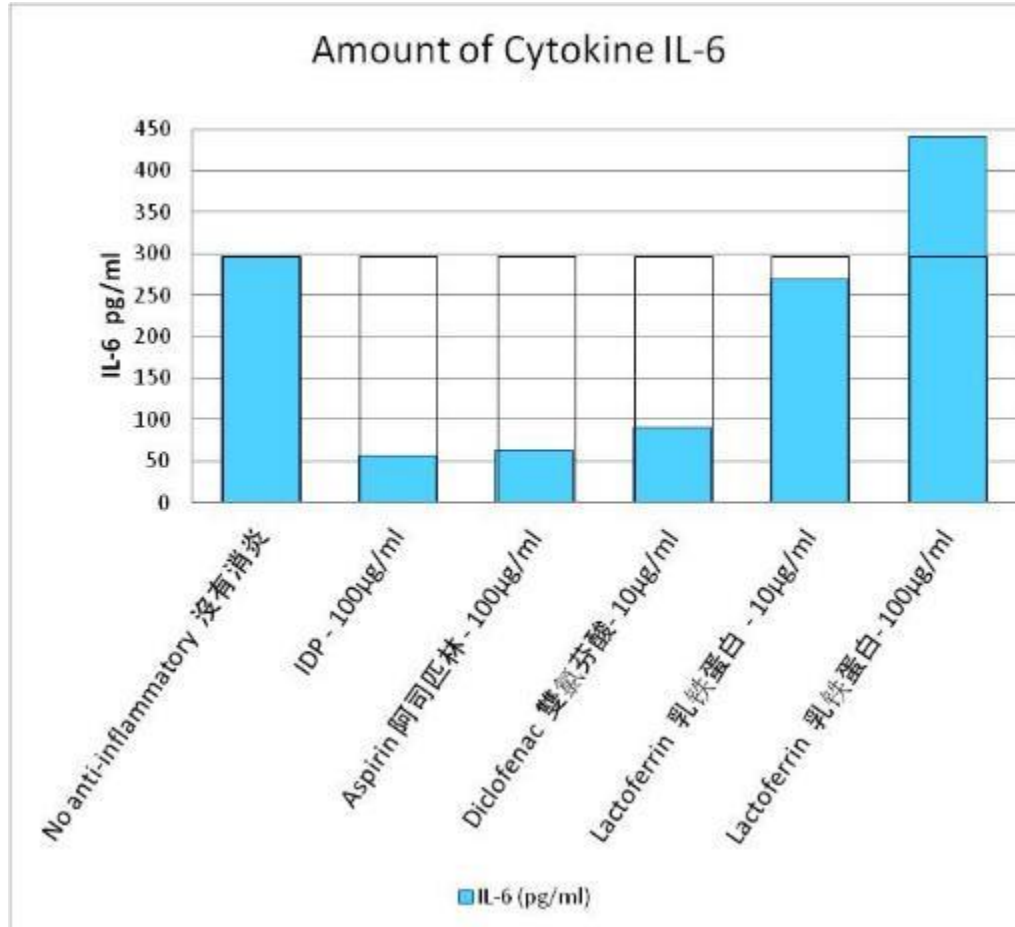
Organisms	IDP® MIC (mg/ml)		IDP® MIC (mg/ml)
<b>Pathogens</b>		<b>Commensals and Probiotics</b>	
<i>Propionibacterium acnes</i>	0.1	<i>Streptococcus salivarius</i>	>5
<i>Trichophyton mentagrophytes</i>	0.1	<i>Streptococcus pneumoniae</i>	>10
<i>Trichophyton rubrum</i>	0.1	<i>Staphylococcus epidermidis</i>	>10
<i>Escherichia coli</i>	0.1	<i>Staphylococcus hominis</i>	>10
<i>Streptococcus pyogenes</i>	0.1	<i>Lactobacillus bulgaricus</i>	>10
<i>Malassezia furfur</i>	0.2	<i>Lactobacillus casei</i>	>10
<b>Commensal/Opportunistic Pathogens</b>		<i>Porphyromonas gingivalis</i>	>10
<i>Candida albicans</i>	0.5		
<i>Streptococcus mutans</i>	2.5		
<i>Staphylococcus aureus</i>	3.0		

- ▶ **Low MIC = Effective Killing**
- ▶ **High MIC = Less Effective Killing**
- ▶ **Together, IDP® has a strong microbiome support or rebalancing effect on the topical surfaces of the body.**





# IDP Anti-inflammatory



- ▶ Lower bars mean better anti-inflammatory action.
- ▶ The IDP<sup>®</sup> is a potent inhibitor of IL-6.
- ▶ Again, IDP<sup>®</sup> is more effective than lactoferrin alone.
- ▶ At the same concentration (100 µg/ml), IDP<sup>®</sup> was as effective as aspirin.

(Independent testing conducted by Trinity Bioactives, Wellington, New Zealand)

# IDP<sup>®</sup> Technology



Skin

epiology.  
oraburst



Mouth



Throat

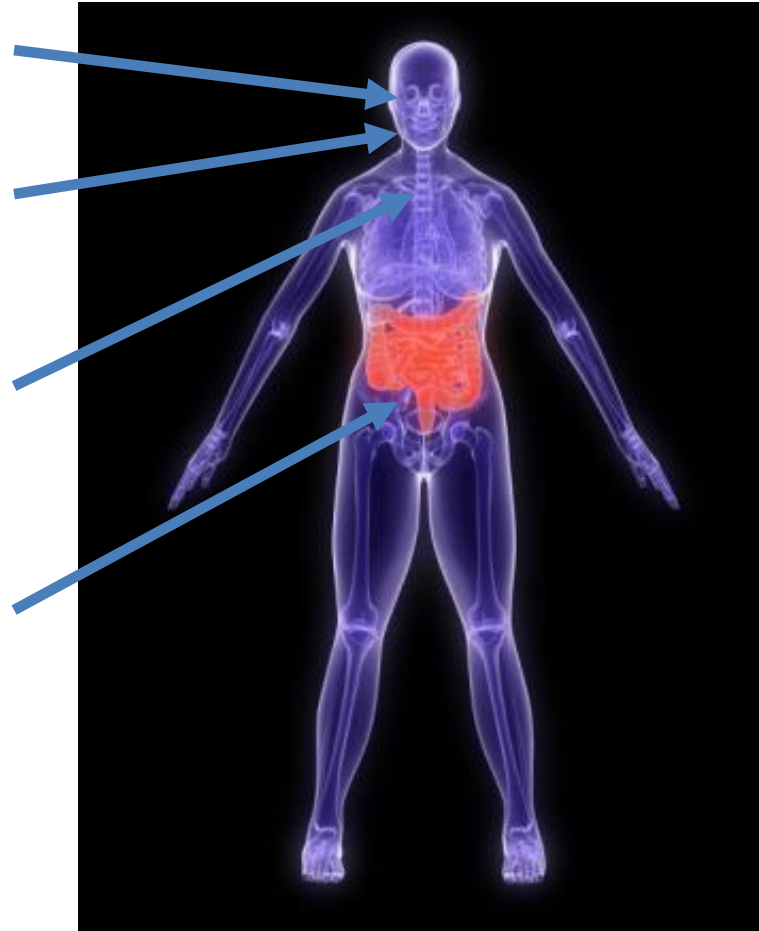
milkamune



Gut

Anzipro<sup>™</sup>  
Immune Defense Proteins

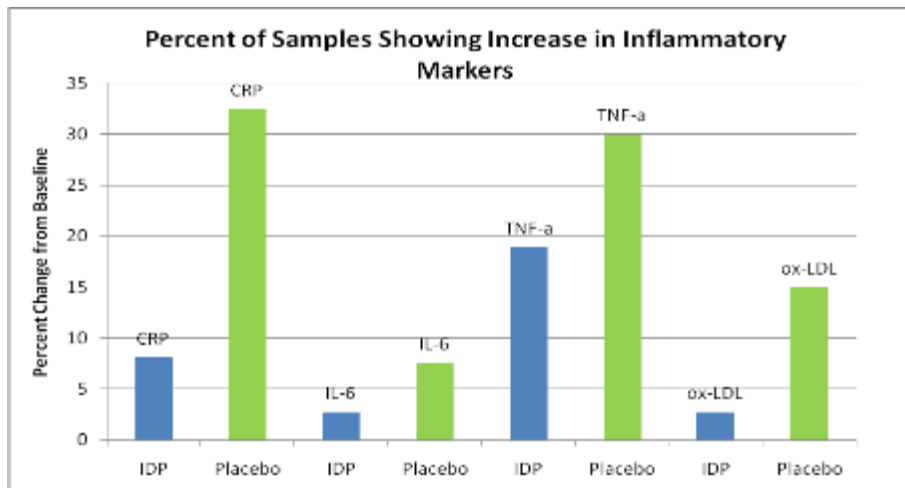
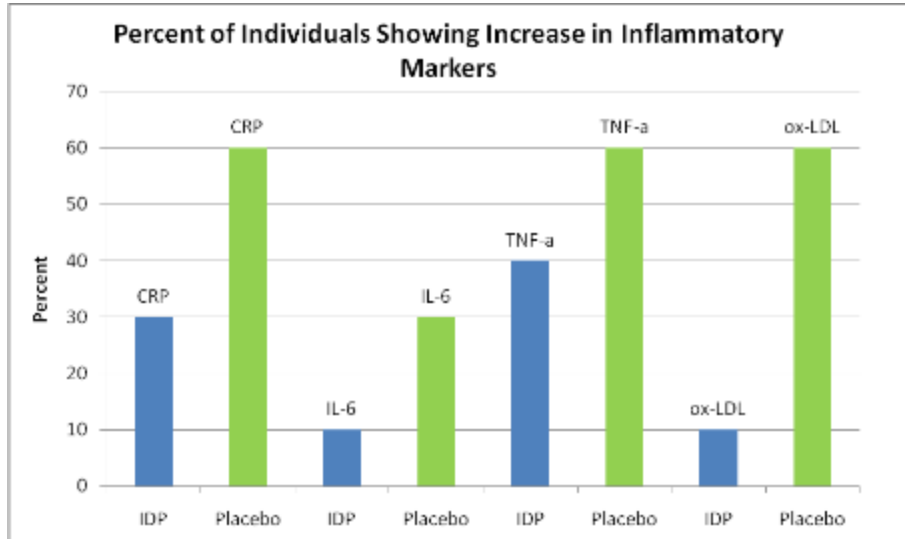
Companion Animal





**IDP**<sup>®</sup>  
Immune Defense Proteins

# IDP Anti-inflammatory Clinical



- ▶ IDP<sup>®</sup> reduced the number of subjects showing an increase in key inflammatory markers
- ▶ IDP<sup>®</sup> reduced the percentage increase in key inflammatory markers over the placebo effect

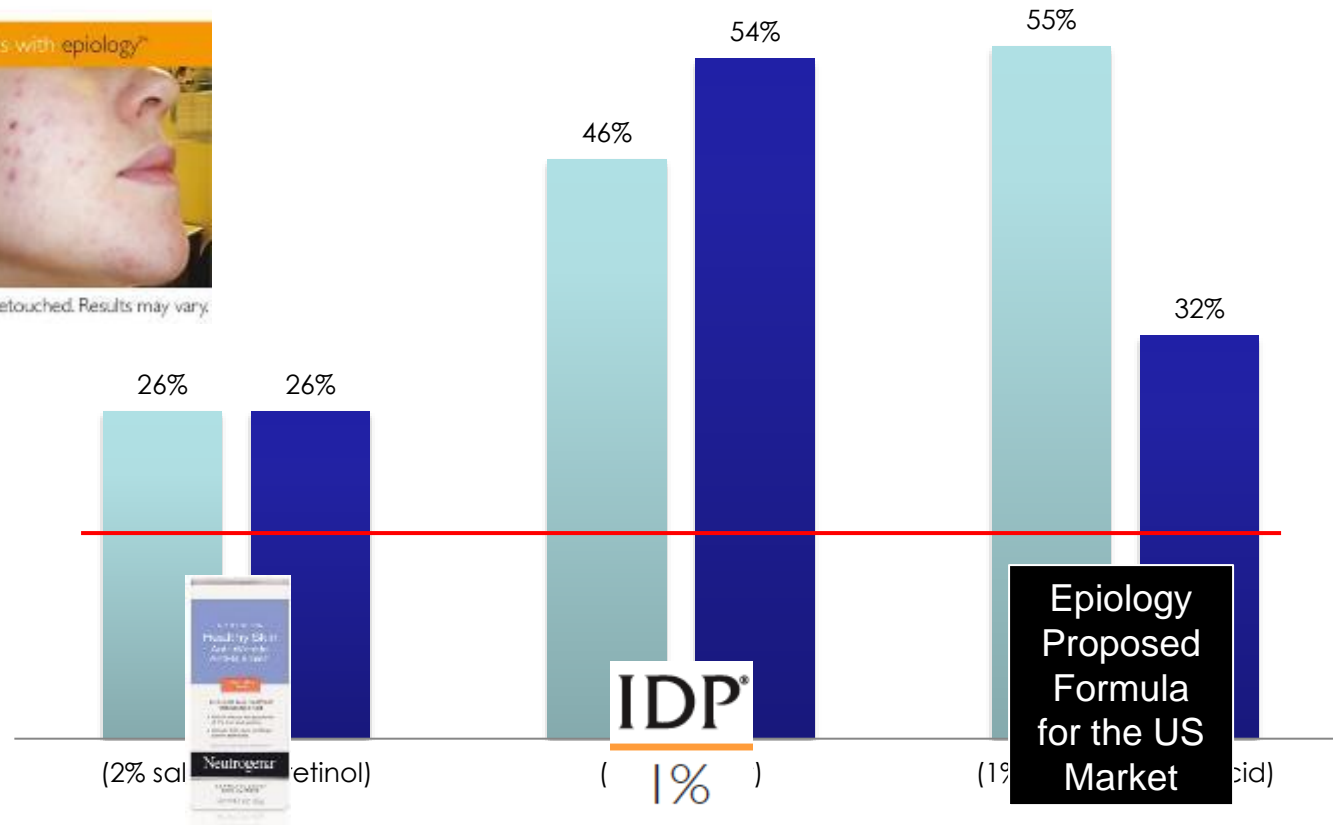


## Number of improvers in redness and inflammation

■ Week 2 ■ Week 6



Photographs were provided by the subject and have not been retouched. Results may vary.





# Proven Global Platform For Natural Skincare

epiology™





Complements of Dr Ingrid Gehrke-Lopes and Dr Hugo Martinez (Epiology Cleanser and Cream – 3 weeks)



BEFORE

AFTER 8 WEEKS OF TREATMENT

AFTER 12 WEEKS OF TREATMENT

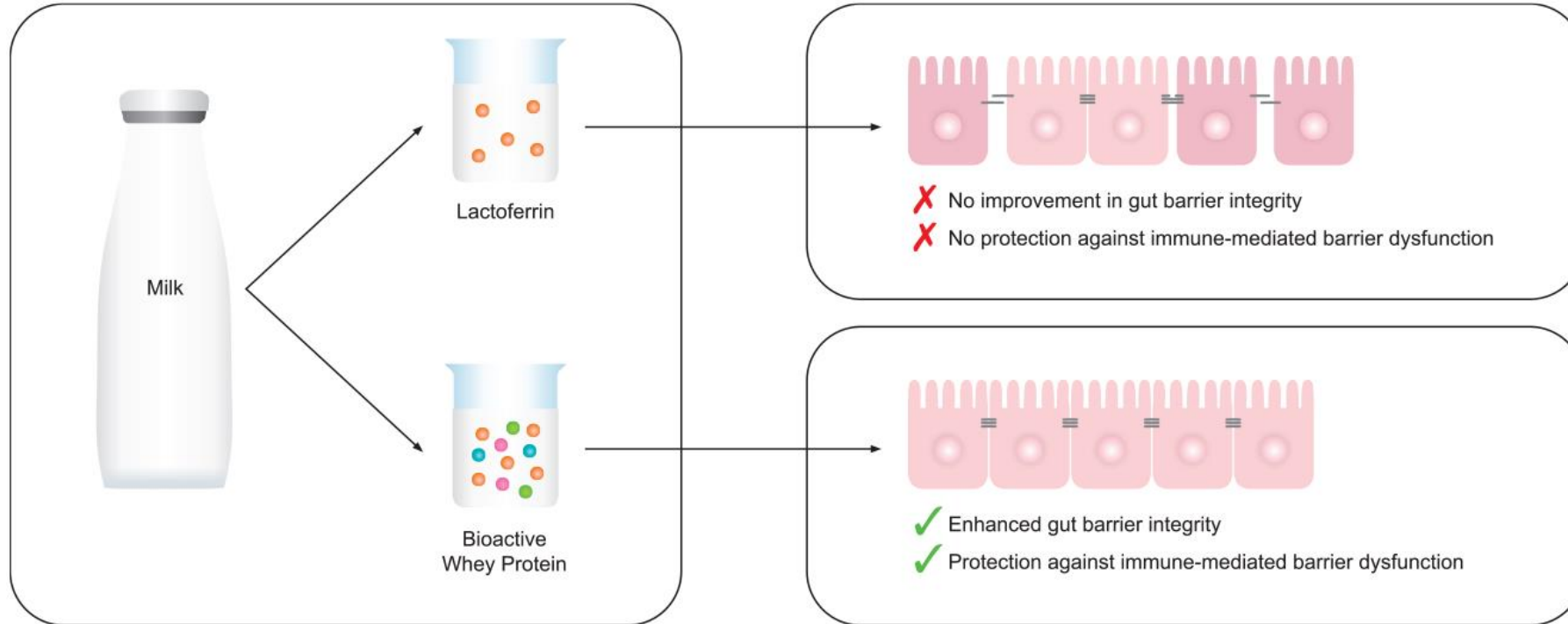
Complements of Dra.Ma. Dolores Alvarez Hdz (Epiology Cleanser, Cream and Spot Gel as a complement to isotretinoin)

epiology™

# IDP HVN Highlights

AgResearch team (Dulantha Ulluwishewa, Jane Mullaney, Rachel Anderson)

Quantec team (Katharine Adam, Rod Claycomb)



## ▶ Stage 1 (published)

- ▶ IDP<sup>®</sup> (whole bioactive whey protein fraction from milk) improved Caco-2 cell transepithelial electrical resistance
- ▶ IDP<sup>®</sup> mitigated immune-mediated intestinal barrier dysfunction *in vitro*

## ▶ Stage 2 (ongoing)

- ▶ Pre-treating intestinal cells with IDP<sup>®</sup> *in vitro* reduces reactive oxygen species after oxidative stress challenge (complete)
- ▶ Human clinical study on effects of IDP<sup>®</sup> exercise-induced gut permeability (in process)

# The Bioactive Journey...

**.... A LONG JOURNEY**

**.... AN EXPENSIVE JOURNEY**

**.... A REWARDING JOURNEY**

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**.... A LONG JOURNEY**

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**THANK YOU!**