

High Value Animal Derived Products Market Opportunities & Pitfalls

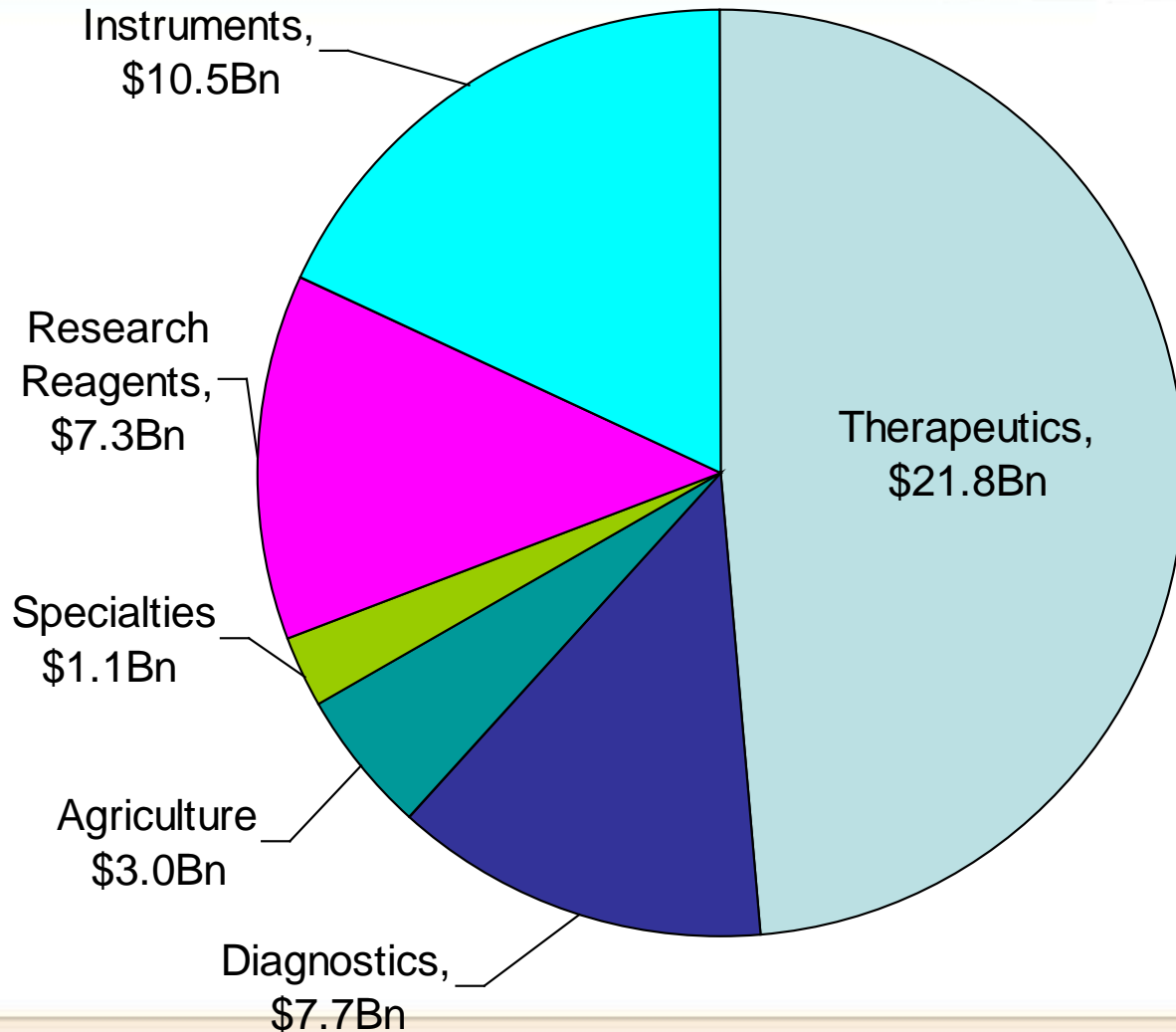


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Global Biotechnology Supplies Market 2008 \$Bn

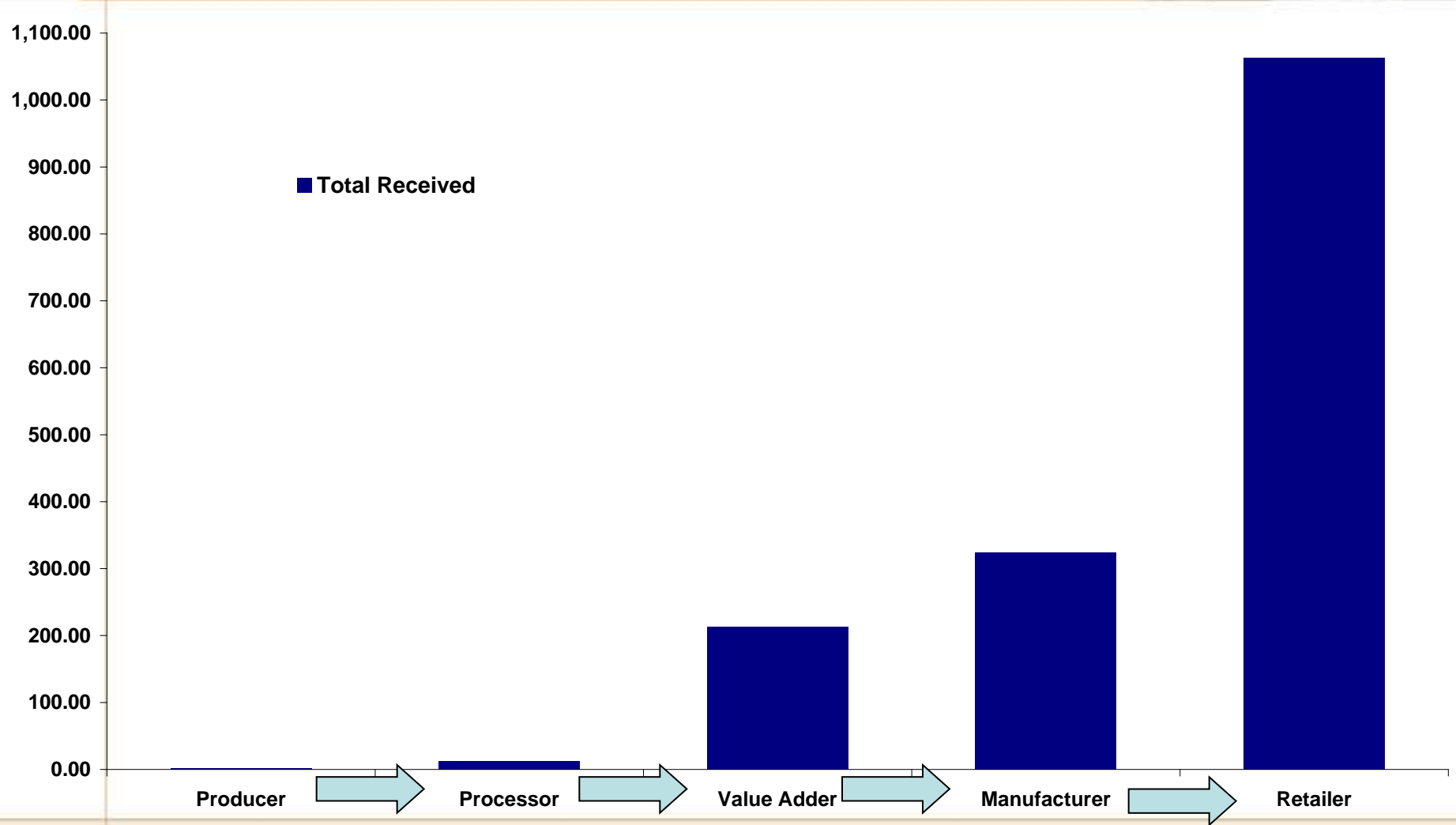


Total = \$52Bn
Growth 5 %
ANZ < 5% market



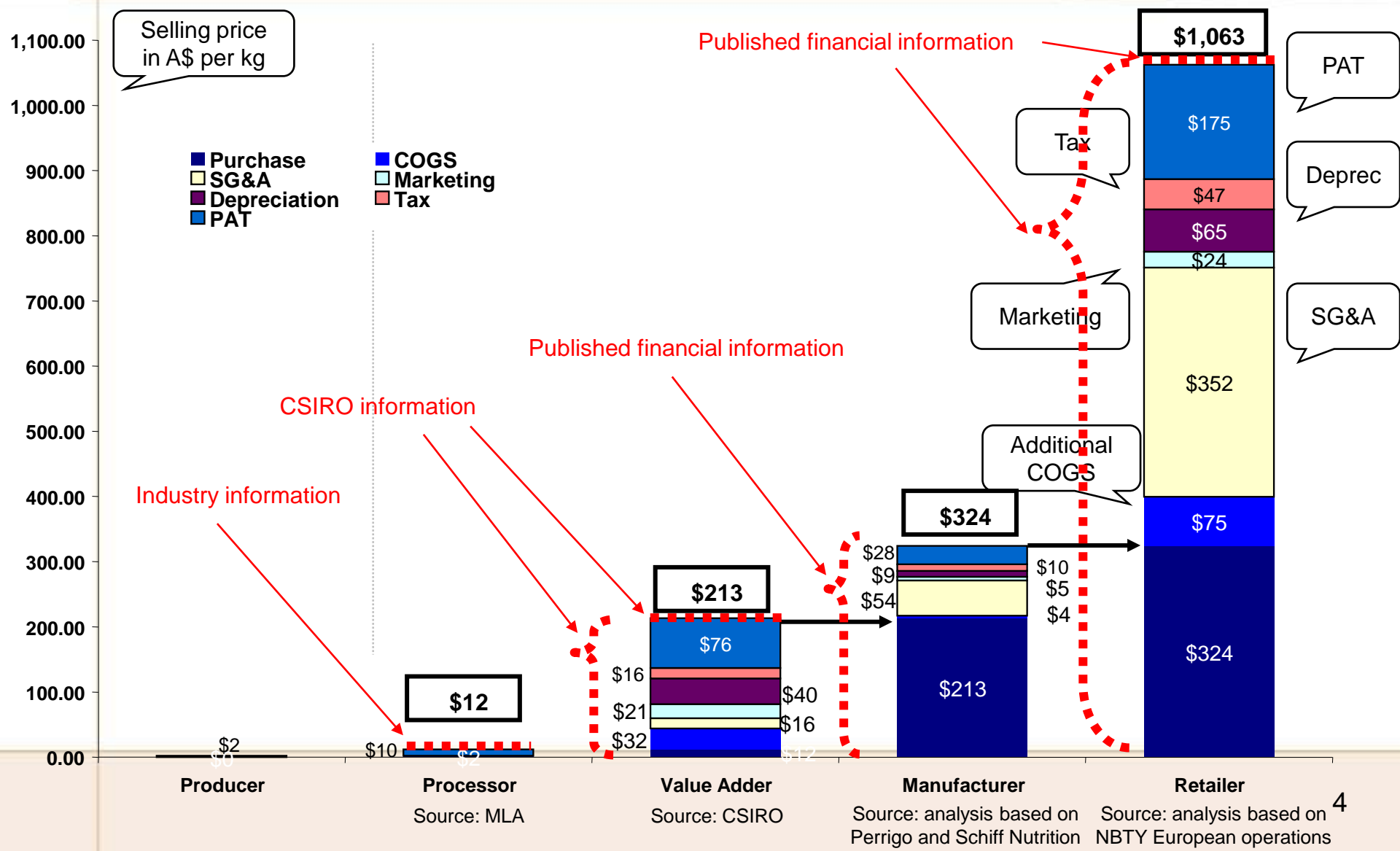
Sources
¹Research & Markets – Biotechnology: Global Initiative.
²RAK and Associates Selected Biotech Markets
³Global Insight – A Study of the European Cosmetics Industry.

Must add value to extract value



Source WHK Greenwoods Bioactive market study of beef, sheep and goat meat: value chain analysis.

Breakdown of expenses along value chain (chondroitin sulphate)

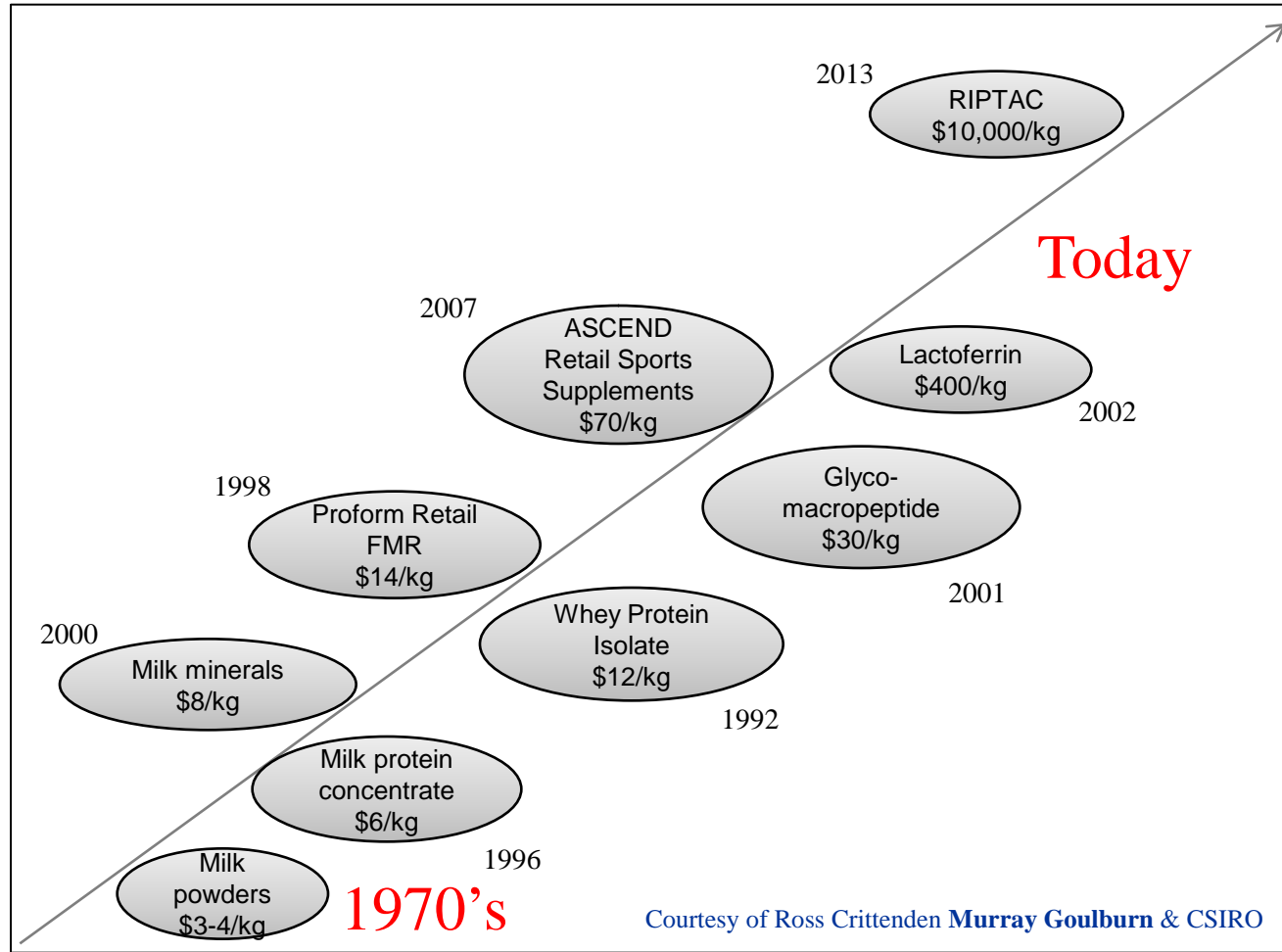


Extracting Value – Dairy Industry



High

Value



PRODUCT TYPE:

Pharmaceuticals

Nutraceuticals

Functional foods

Commodities

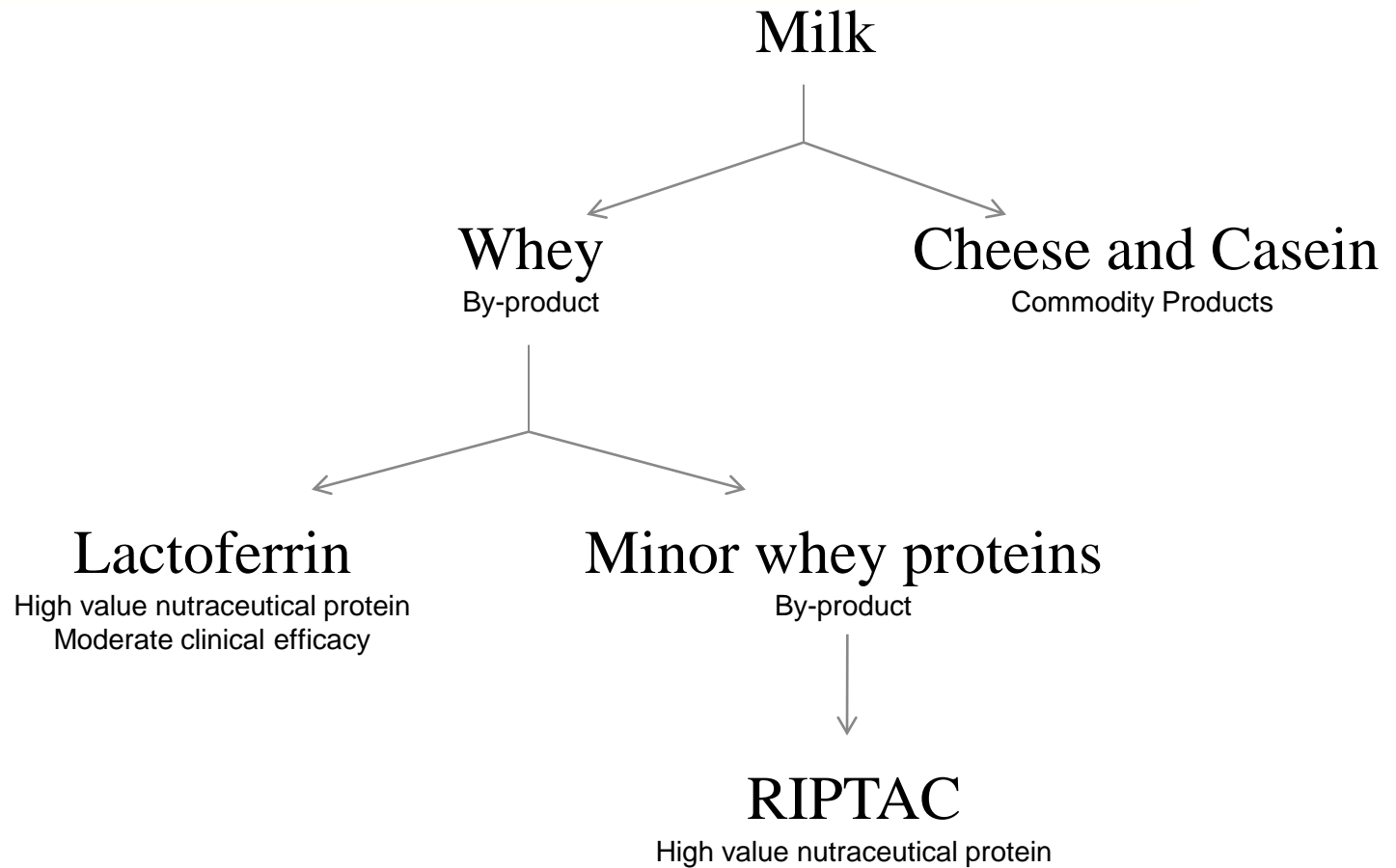
Low

Cost (AUD)

High

Courtesy of Ross Crittenden Murray Goulburn & CSIRO

Extracting value – Dairy Waste Stream



Extracting value – Meat Processing Waste Stream



Carcase

Blood

By-product

Meat

Commodity Products

Plasma

Functional animal / human food

Red blood cells

Hb

Technical – Vaccines/Diagnostics
Nutraceutical for Iron Deficiency
Animal Feed + Colorant.

IgG

Technical – Assays/ diagnostics

BSA

Technical – media, assay
Nutraceutical

TH

Medical device – tissue sealant

Key

IgG – Bovine Immunoglobulin G

TH – Thrombin

BSA – Bovine Serum Albumin

Hb - Haemoglobin

Increasing demand for plasma



- New process to stabilise plasma
- New application for plasma in manufactured foods and pet foods
- More than 500 tons plasma / month in Pet Food alone
- Development of new applications for plasma proteins in food and nutraceuticals



Blood based bioactives



Available for download from

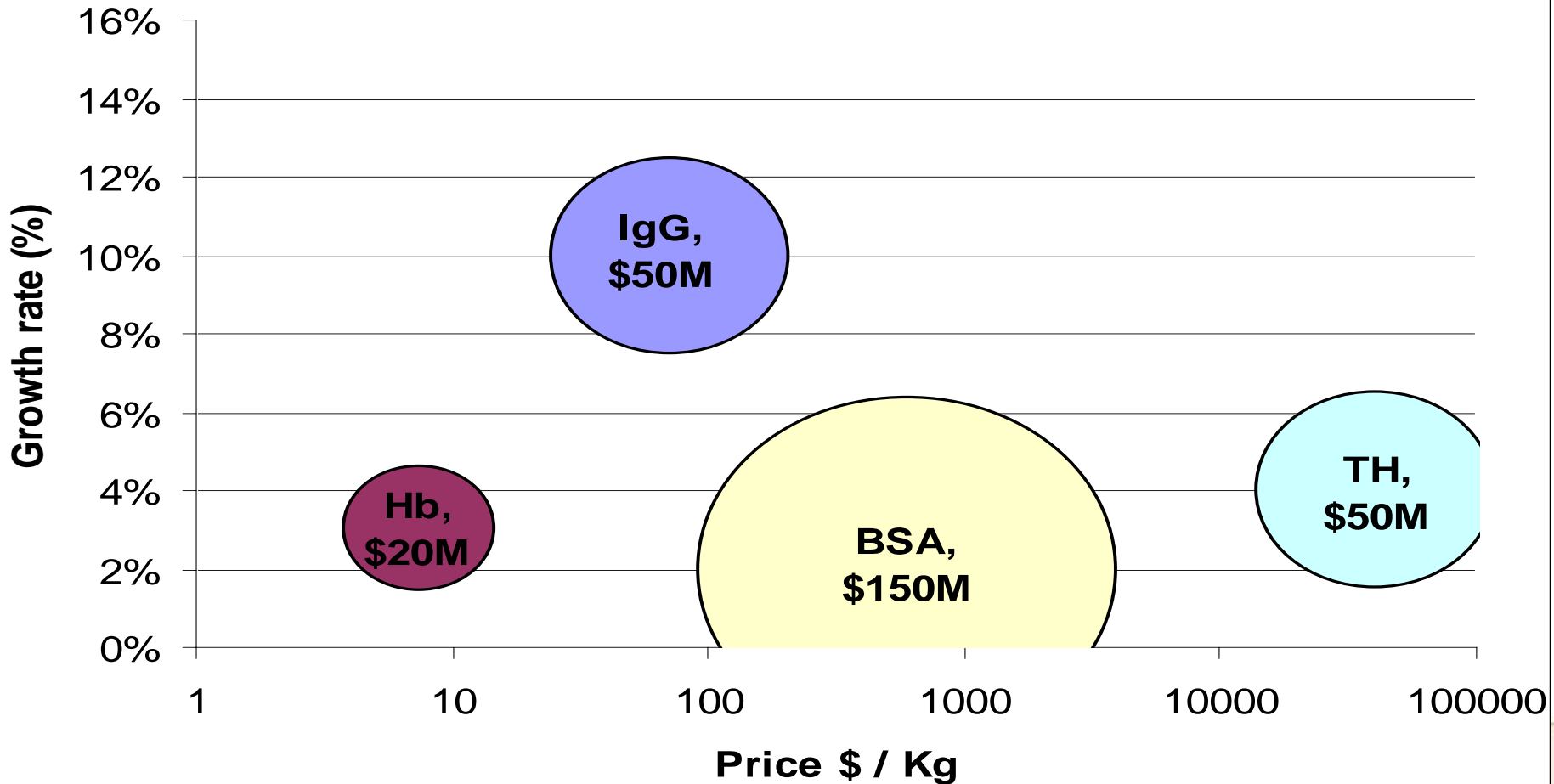
www.redmeatinnovation.com.au/project-reports/report-categories/co-products/bioactive-opportunities-for-the-australian-red-meat-industry



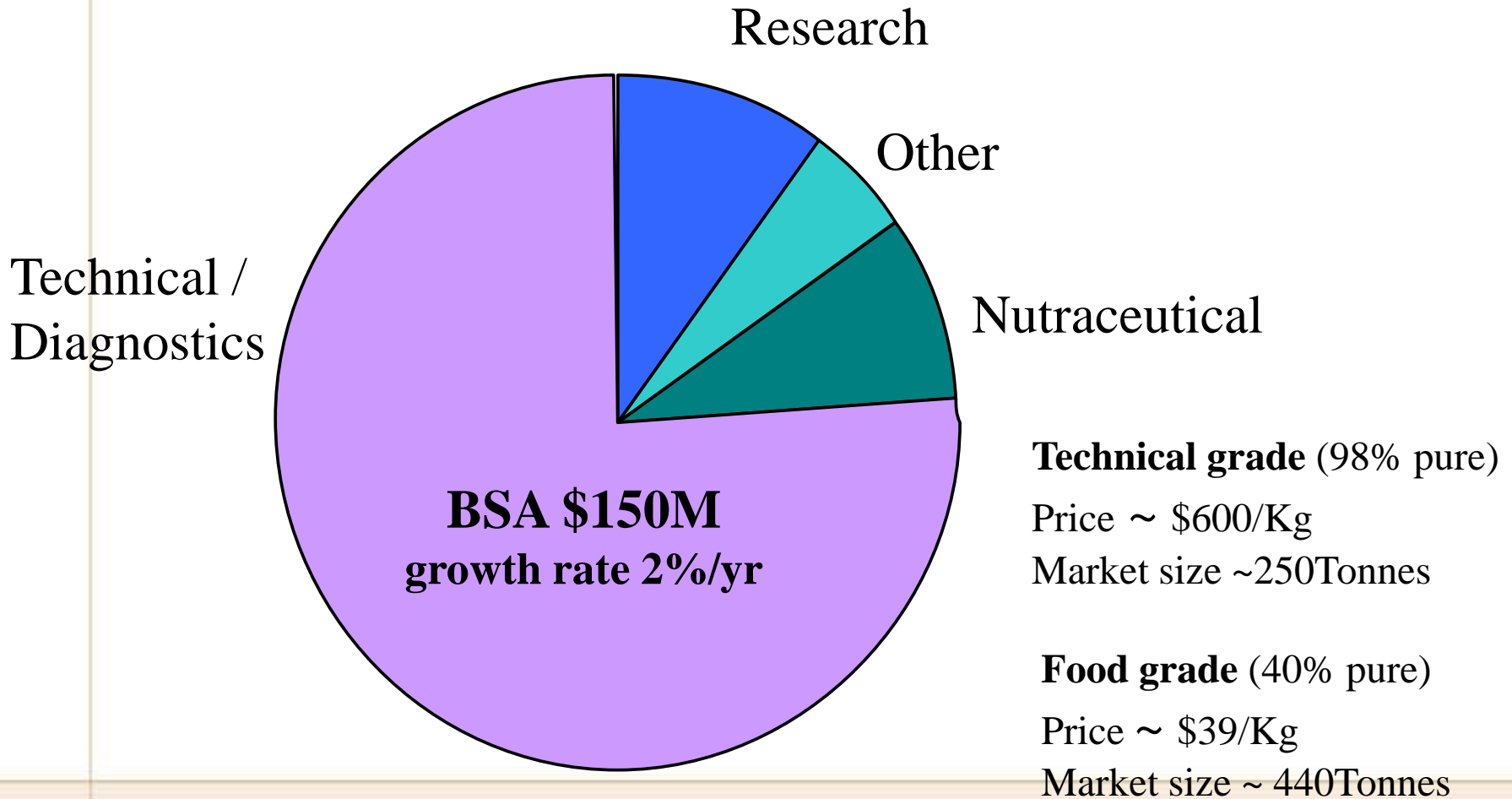
Blood Based Bioactives



Blood based bioactives - Market Opportunity \$



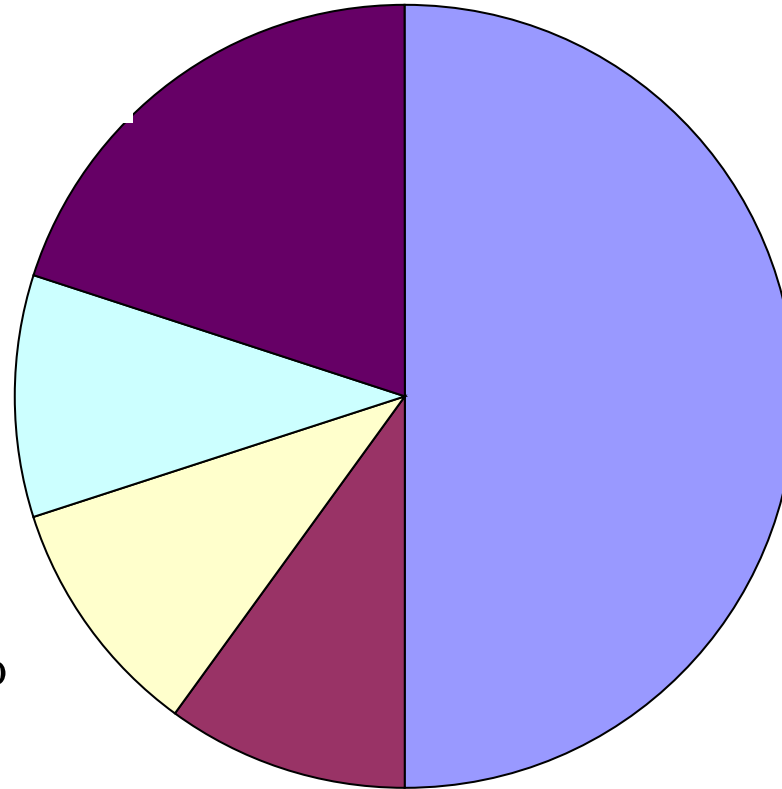
BSA – Market (technical grade)



BSA – Market Share



Others 20%



Millipore 10%

Proliant Inc 50%

Sigma-Aldrich 10%

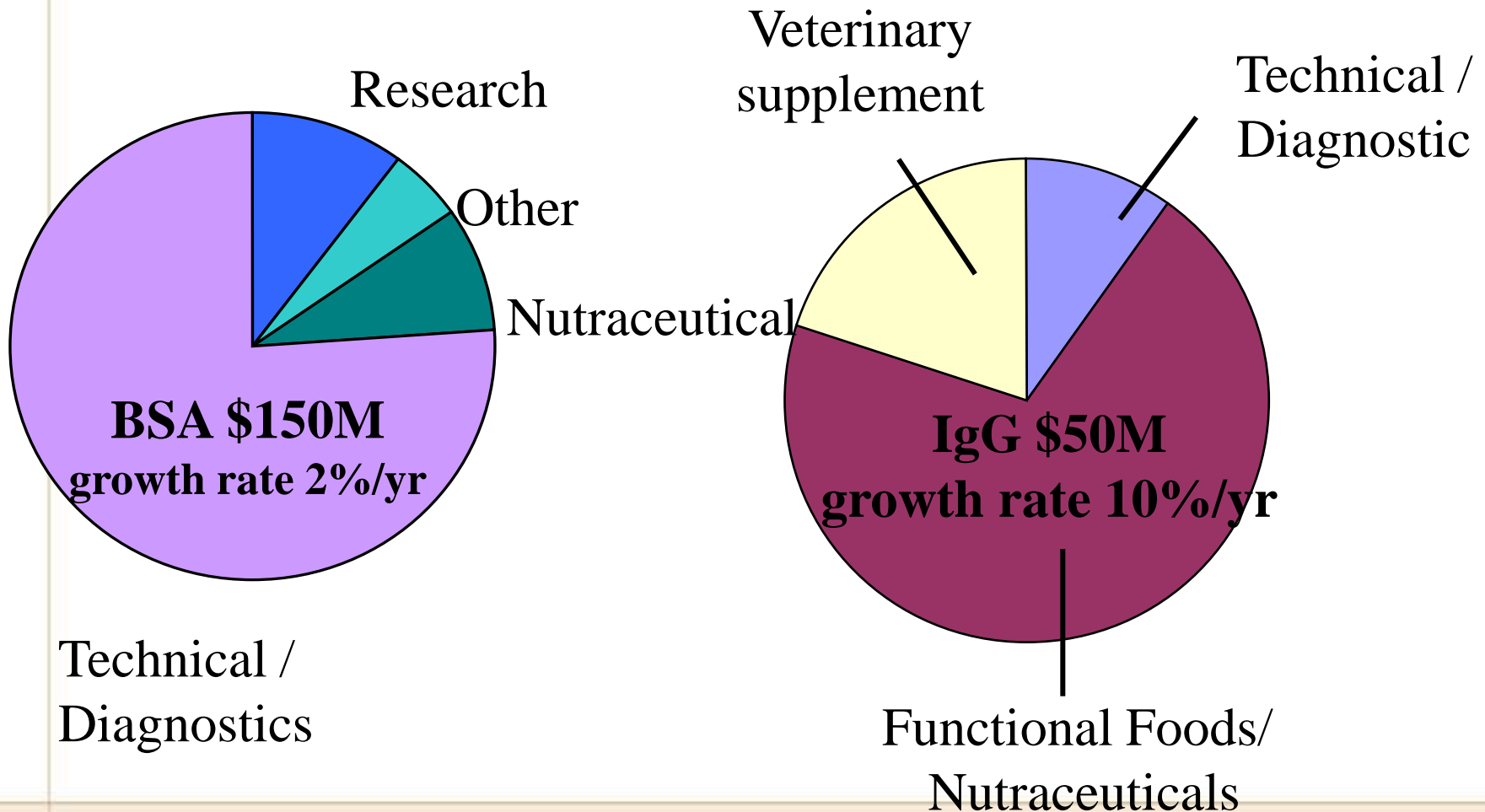
Invitrogen 10%
(Life Technologies)

BSA revenue model



Payback	3 years (based on NPAT)
Capital costs	\$850,000 (based on used equipment 40% of new price)
Sales price	\$500 /kg
Market share	0.75% in year 5
Benefit / head	\$8.2 in year 5 based in 120,000 head Number head to produce bioactive is 16,000

Understand the market – new opportunities



Pitfalls - Regulatory Hurdles





Millipore (Market Cap \$4.0Bn)

- Animal-derived from GBR-1 countries e.g. **New Zealand**,
- Confirm sourcing and traceability of raw materials
- Ensure supplements are manufactured in ISO accredited manufacturing plants built to cGMP compliance

Source: <http://www.millipore.com/bioproduction/bp3/cellculture>

Recombinant Thrombin



Move away from animal-derived - Flogging a dead horse



Insulin Story

- Animal Sources
 - 1923 - First commercially produced by Eli Lilly
 - 1980 - Predicted limited supply by 2000
- Recombinant Human Insulin
 - 1973 - first artificial gene
 - 1980 - first clinical trials of Human Insulin – Genentech/ Lilly
 - 1982 - doubts over safety and costs of Human Insulin
 - 1985 - 90% UK diabetics on animal derived in 1985
 - 1989 - 80% on (recombinant) human insulin
 - 1985 - Improved/ targeted varieties of Insulin
 - 2004 - Insulin sales \$US6.75Bn
 - 2009 - Hoffman La Roche acquires Genentech for \$47Bn.
- Sources www.diabeteshealth.com/read/2008/01/01/5791/the-history-of-human-insulin-problems-and-the-loss-of--choice-1980-to-1993/
www.gene.com/gene/about/corporate/history/timeline.html

Never say never!



Heparin

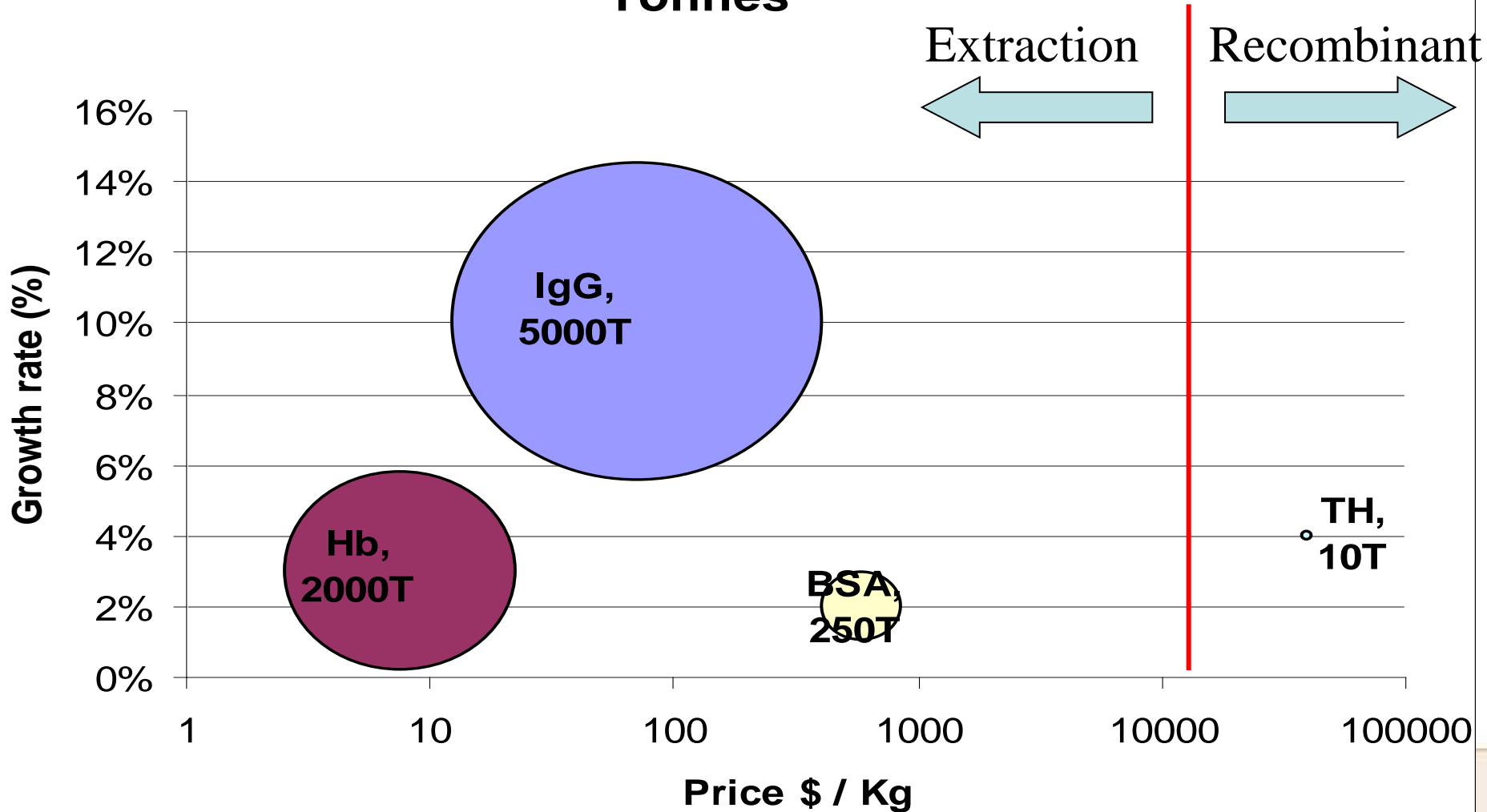
- 1930s - used as anti-coagulant and antithrombotic

Sourced mainly from cattle and pigs

- 2004 - Market size \$US3.5Bn
- 1997- Synthetic heparin is unlikely – too complex¹
- 2002 - Synthetic heparin launched

The benefits of Meat Research in NZ – Foundation for Research, Science and Technology, 1997.

Blood based bioactives - Market Opportunity Tonnes



Conclusions –



- High value animal products still offer significant opportunity
- Dynamic market
- Highly regulated market
- Need science, technical, legal and business platforms
- Understand customers (e.g. distributors) needs
- Partner early if possible
- Business plan before embarking on the journey