

MINTRAC National Training Conference

Innovation:
Keeping our supply chains sustainably profitable

Sean Starling

Agenda

- Claims against our industry (and MLA's response)
- Industry (processing) cash flows
- Alternative proteins – Are the claims valid?
- What is lab-grown meat
- A case study

Claims against our Industry

MLA response to alternate proteins

	Environment	Health (Human)	Health (Animal)	Planetary Resources
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MLA response to alternate proteins

	Environment	Health (Human)	Health (Animal)	Planetary Resources
Alt. Protein Claims	•Emissions	•Food safety •Nutrition & Health •Antibiotic free •Food security •Shelf stable	•Cruelty	•Rainforest deforestation •Water •Energy

MLA response to alternate proteins

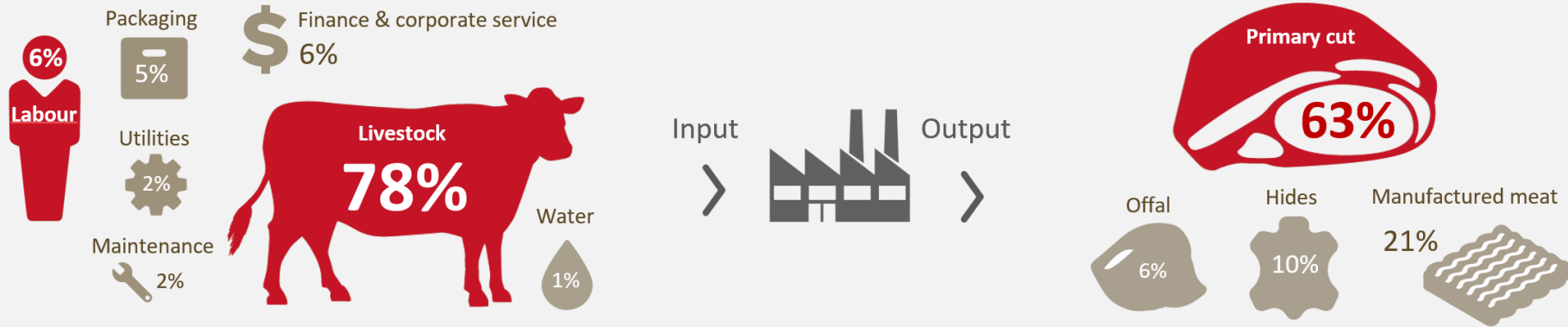
	Environment	Health (Human)	Health (Animal)	Planetary Resources
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MLA Initiatives (Now)	<ul style="list-style-type: none">•CN30 Program•Genetics•Feedbase & Feeds	<ul style="list-style-type: none">•Food safety R&D and Stds.•Nutrition R&D•New technologies and packaging for increasing shelf life	<ul style="list-style-type: none">•Animal handling standards•Legislation	<ul style="list-style-type: none">•Satellite mapping to show ethical land use.•Water recovery and generation projects•Energy recovery and generation projects

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Industry Cash flow (Processing)

Current cost of doing business



- Trim is targeted by fake meat industry (as is hides)

Note: processors operate at <5% GP

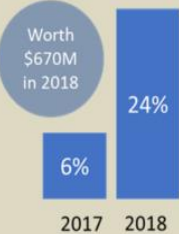
Are the alternative claims valid?

V.RMH.0081 MLA project with UQ (due for completion Y19)

Comparison of traditional and artificial beef production systems



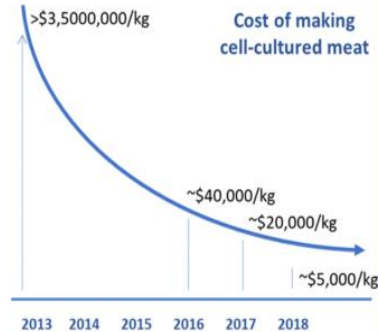
Growth of plant-based meat substitutes



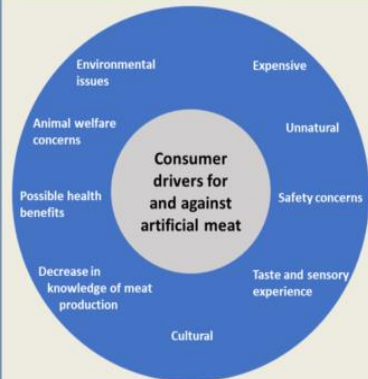
The **plant-based meat** industry is gaining market share. New generation products target meat eaters - a highly profitable segment.

Key messages

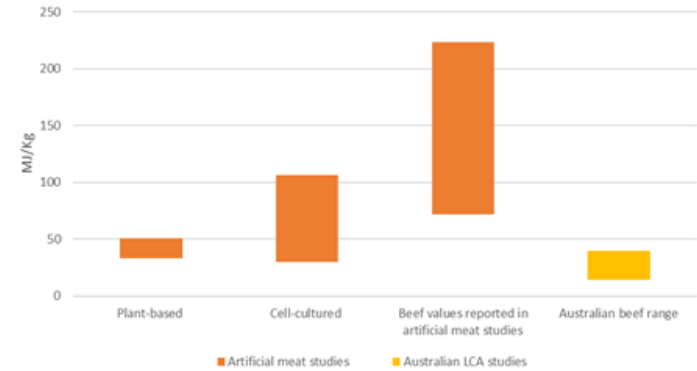
Despite the hype and reported cost reductions, the **cell-cultured meat** industry has not delivered a commercial product. Technology, regulatory and social acceptance challenges remain. Mass market retail products could be 3-5 years away.



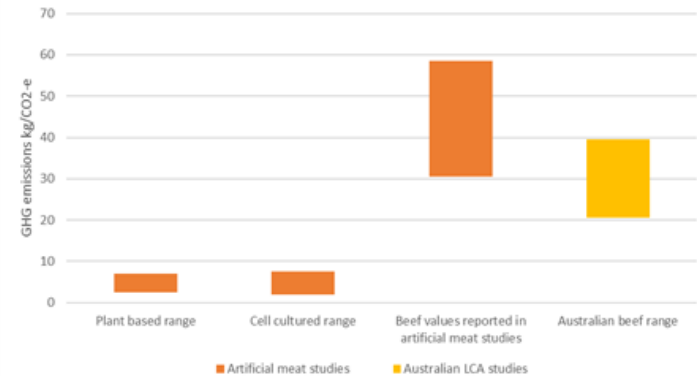
The artificial meat industry has a sophisticated marketing message that targets health, environmental and ethical issues associated with traditional beef. Few independent studies critically examine these claims. Desktop analysis suggests some environmental claims are overstated in the Australian context.



Energy demand - artificial and traditional beef comparison



GHG emissions - artificial and traditional beef comparison



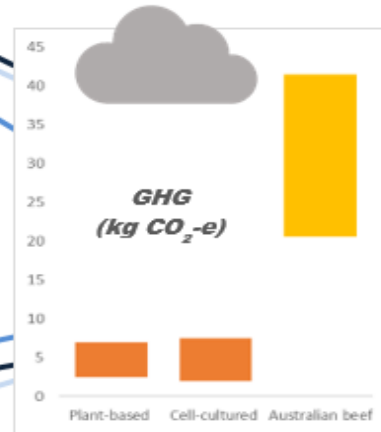
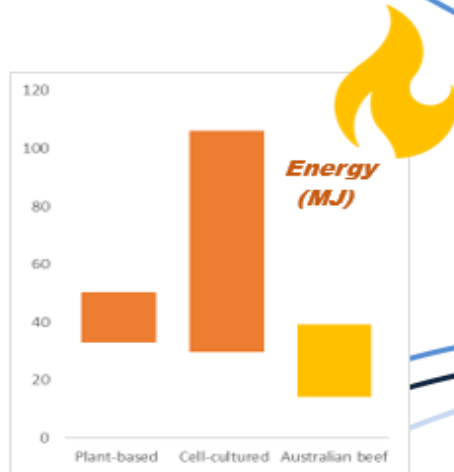
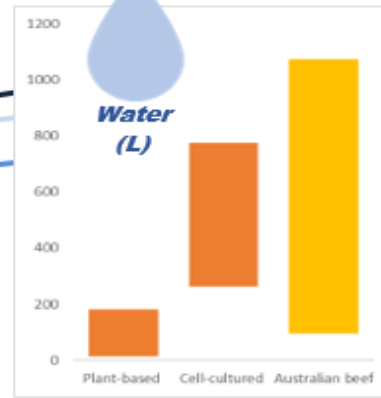
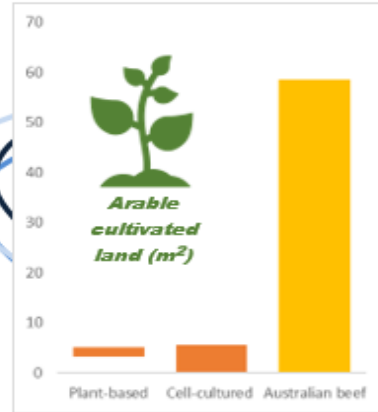
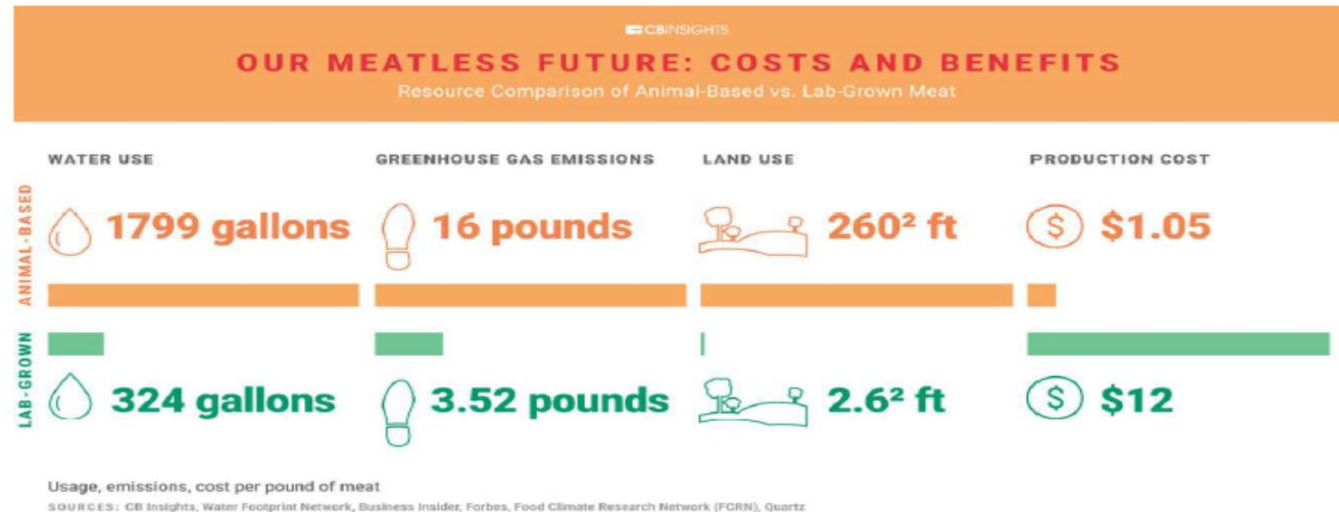


TABLE 1 | Emissions profiles of cultured meat and beef cattle production, expressed as individual gases and total IPCC 5th Assessment Report 100-Years Global Warming Potential carbon dioxide equivalent (GWP₁₀₀ CO₂e) per kg of meat output (either cultured meat or bone free beef).

Production system	Annotation	CO ₂	CH ₄	N ₂ O	GWP ₁₀₀ CO ₂ e
CULTURED MEAT					
Tuomisto and Teixeira de Mattos (2011)—low	Cultured-a	1.69			1.69
Tuomisto et al. (2014)—average	Cultured-b	3.67			3.67
Mattick et al. (2015b)—average	Cultured-c	6.64	0.019	0.0013	7.5
Mattick et al. (2015b)—high	Cultured-d	22.1	0.062	0.0043	25
BEEF CATTLE					
Swedish ranch	Sweden	0.90	0.8	0.02	28.6
Brazilian pasture	Brazil	0.90	1.2	0.03	42.45
USA Midwestern pasture	Mid-West USA	5.4	0.8	0.06	43.7




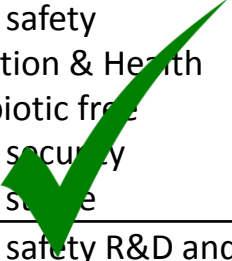


The “Sustainability conversation”

The “Nutrition conversation”

	<i>85% Lean beef burger</i>	<i>Impossible Burger</i>	<i>Beyond Burger</i>	<i>Quorn Burger</i>	<i>B12 Burger</i>
<i>Serving size</i>	113g	85g	113g	80g	
	Per 100g	Per 100g	Per 100g	Per 100g	Per 100g
<i>Total Fat (g)</i>	15	15.3	17.7	6.3	20
<i>Saturated Fat (g)</i>	5.9^	11.8	4.4	2.5	18
<i>Cholesterol (mg)</i>	71	0	0	6.3	0
<i>Protein (g)</i>	18.6	23.5	17.7	11.3	14.4
<i>Fibre (g)</i>	0	0	2.7	2.5	4.1
<i>Sodium (mg)</i>	66	506	336	538	480
<i>Iron (mg)</i>	2.4	3.5	#	< 0.5 mg	#
<i>B12 (mcg)</i>	2.6^	2.6*	#	#	1.5*
<i>Protein Sources</i>	Beef mince	Textured wheat protein and potato protein	Pea protein isolate	Mycoprotein, textured wheat protein and egg white	Soy, pea and wheat protein
<i>* Supplemented</i>					
<i># No information listed</i>					

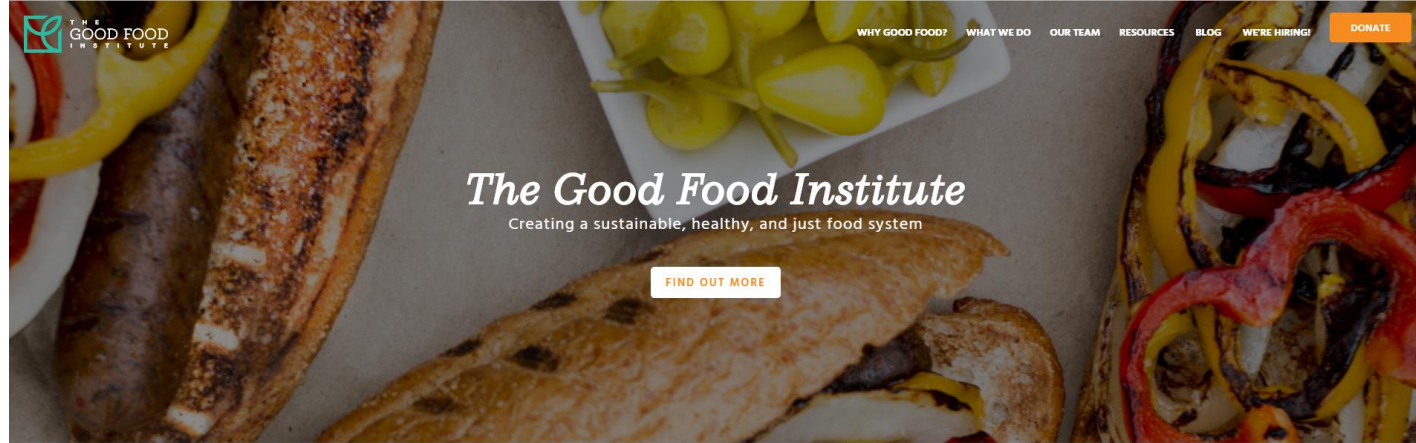
Table 1. Nutritional comparisons of popular plant-based meat burgers

MLA response to alternate proteins

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What is cell base meat

Cell based meat



Imagine a food system where the most affordable and delicious products are also good for our bodies and the planet.

Here's how we do it.



Clean Meat 101 with Dr. Liz Specht

1,018 views

12 0 SHARE SAVE ...

Cell based meat

Clean Meat Production at Scale

SAMPLE

A small sample of cells is obtained from an animal.



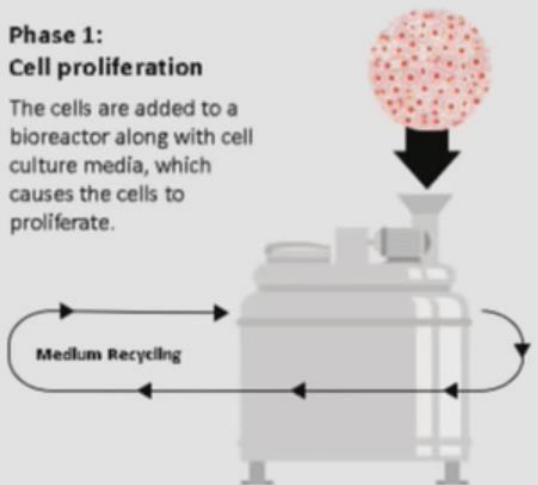
CELL STARTER CULTURE



Phase 1:

Cell proliferation

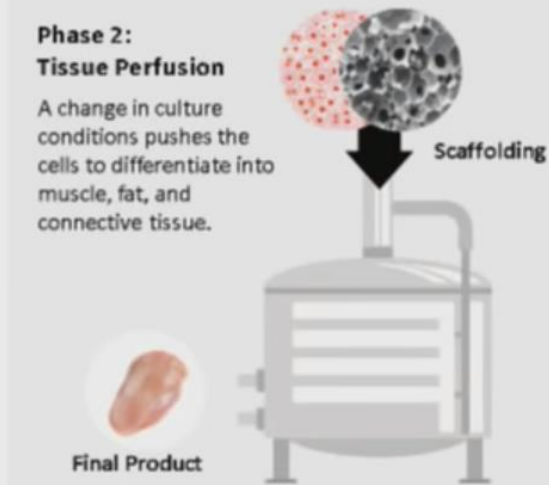
The cells are added to a bioreactor along with cell culture media, which causes the cells to proliferate.



Phase 2:

Tissue Perfusion

A change in culture conditions pushes the cells to differentiate into muscle, fat, and connective tissue.



CELLS AT MATURATION
Primarily muscle, fat, and connective tissue.

Fat
Cell



Muscle
Cell

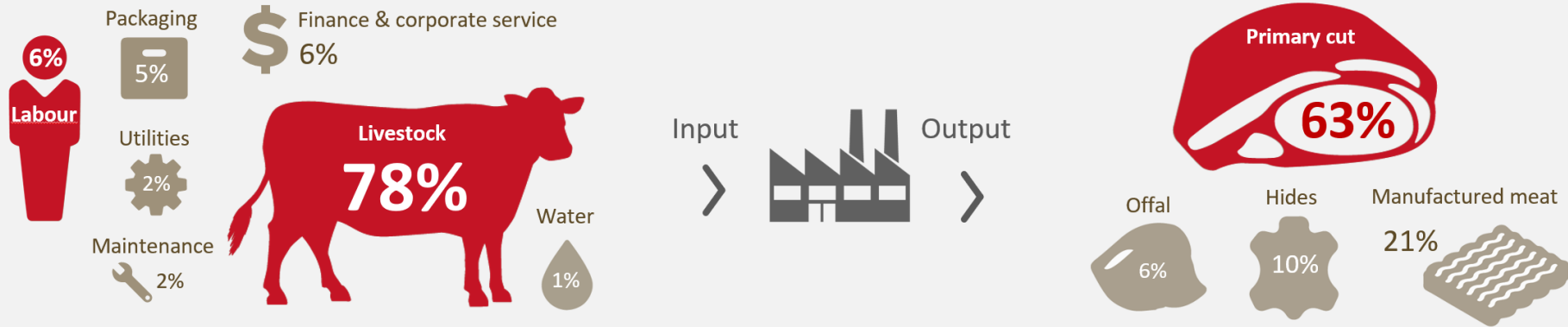


Fibroblast
Cell



An MLA case study

Current cost of doing business



- Trim is targeted by fake meat industry (as is hides)

Note: processors operate at <5% GP

A case study



Recap – The take home messages

- Claims against our industry (and MLA's response)

Environment, Health (human), Health (animal) & Resources

- Industry (processing) cash flows

'20%' Trim & '10%' Hide (\$)

- Alternative proteins – Are the claims valid?

Probably only one

- What is lab-grown meat

Still evolving → a long time off center of plate

- A case study

MLA will continue to develop alternative trim uses

DISCUSSION

Innovation:
Boning Automation & Objective Measurement

THANK YOU