



Pork, more than a good source of protein

Brian Sullivan, CEO

Canadian Centre for Swine Improvement

Outline



Introduction



Macronutrients in the human diet



Macronutrients from pork



Opportunities for the pork industry



Technology and tools for pork quality



Take home messages



Introduction

A personal journey...



What makes a healthy diet for humans?

- Good quality protein, essential amino acids?
- Low in fat but enough essential fatty acids?
- Lots of fruits and vegetables?
- Energy in equal to energy expended?
- High quality fibre?
- All the needed vitamins and minerals?

Is it “yes” to all of the above and how does pork fit with a healthy diet?

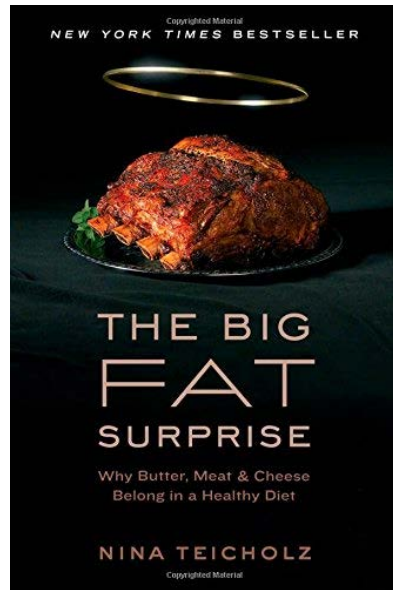
65th Annual Reciprocal Meat Conference June 2012, Fargo, North Dakota

Keynote presentation by Gary Taubes:

“Why We Get Fat: Adiposity 101 and the
Alternative Hypothesis of Obesity”



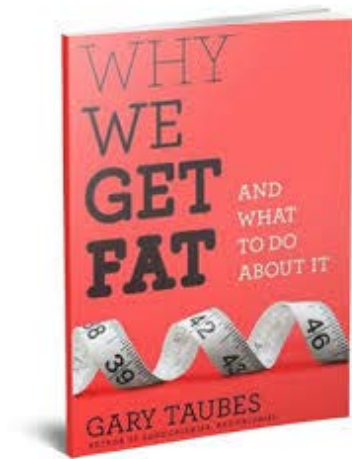
AMERICAN MEAT SCIENCE ASSOCIATION



CMC Annual Conference Ottawa, June 2017

Keynote presentation by Nina Teicholz:

“The Big Fat Surprise”



CANADIAN MEAT COUNCIL
CONSEIL DES VIANDES DU CANADA

CMC Annual Conference Montreal, May 2018

Keynote presentation by Gary Taubes:

“Why we get fat and what to do about it”

Our energy comes from macronutrients



- Carbohydrate, Fat and Protein
- In general, if we cut back on one, we increase consumption of the others
- In practice, protein remains fairly constant
- If you eat less fat, you eat more carbs
- If you eat more fat, you eat less carbs



Macronutrients in the human diet

Estimates of US food supply (not consumption)

From Lisa J. Harnack et al. 2000

	1970			1994		
	g	Calories	%	g	Calories	%
Fat	154	1386	41.9%	159	1431	37.3%
Carbohydrates	386	1544	46.6%	491	1964	51.2%
Protein	95	380	11.5%	110	440	11.5%
Total		3310	100%		3835	100%

1994 diet versus “low carb” alternatives

1994 percentages

	g / day	% of energy
Fat	125	38%
Carbohydrates	383	51%
Protein	86	11%

Liberal “low carb” (max 400 g / day)

	g / day	% of energy
Fat	117	35%
Carbohydrates	400	54%
Protein	86	11%

Moderate “low carb” (max 200 g / day)

	g / day	% of energy
Fat	206	62%
Carbohydrates	200	27%
Protein	86	11%

Ketogenic (max 20 g / day)

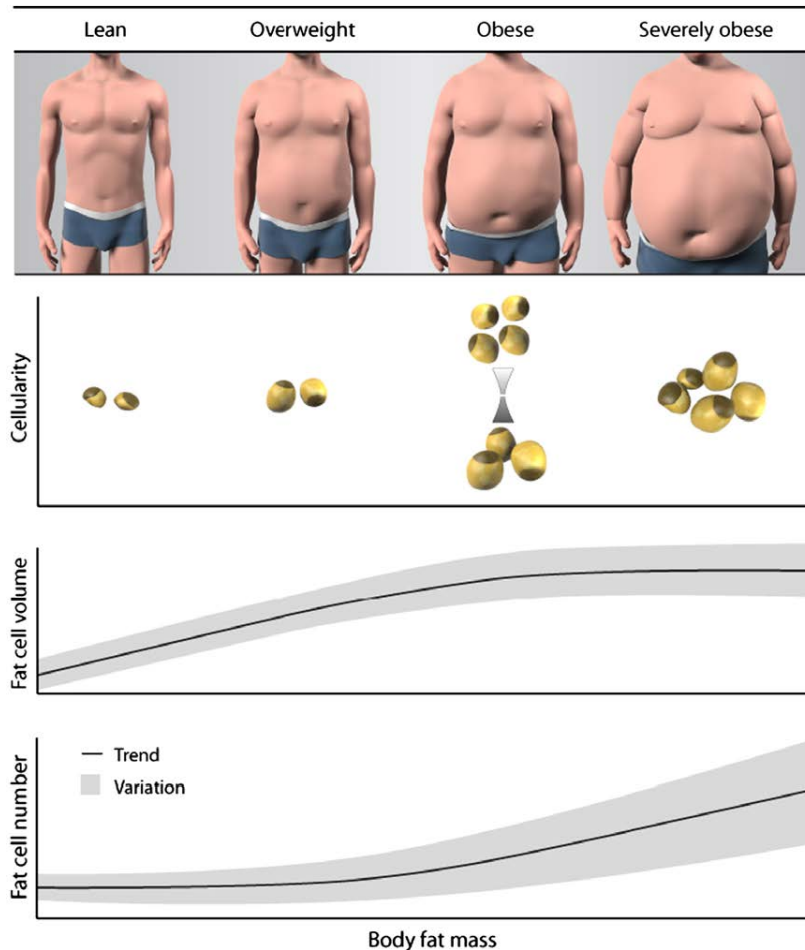
	g / day	% of energy
Fat	286	86%
Carbohydrates	20	3%
Protein	86	11%



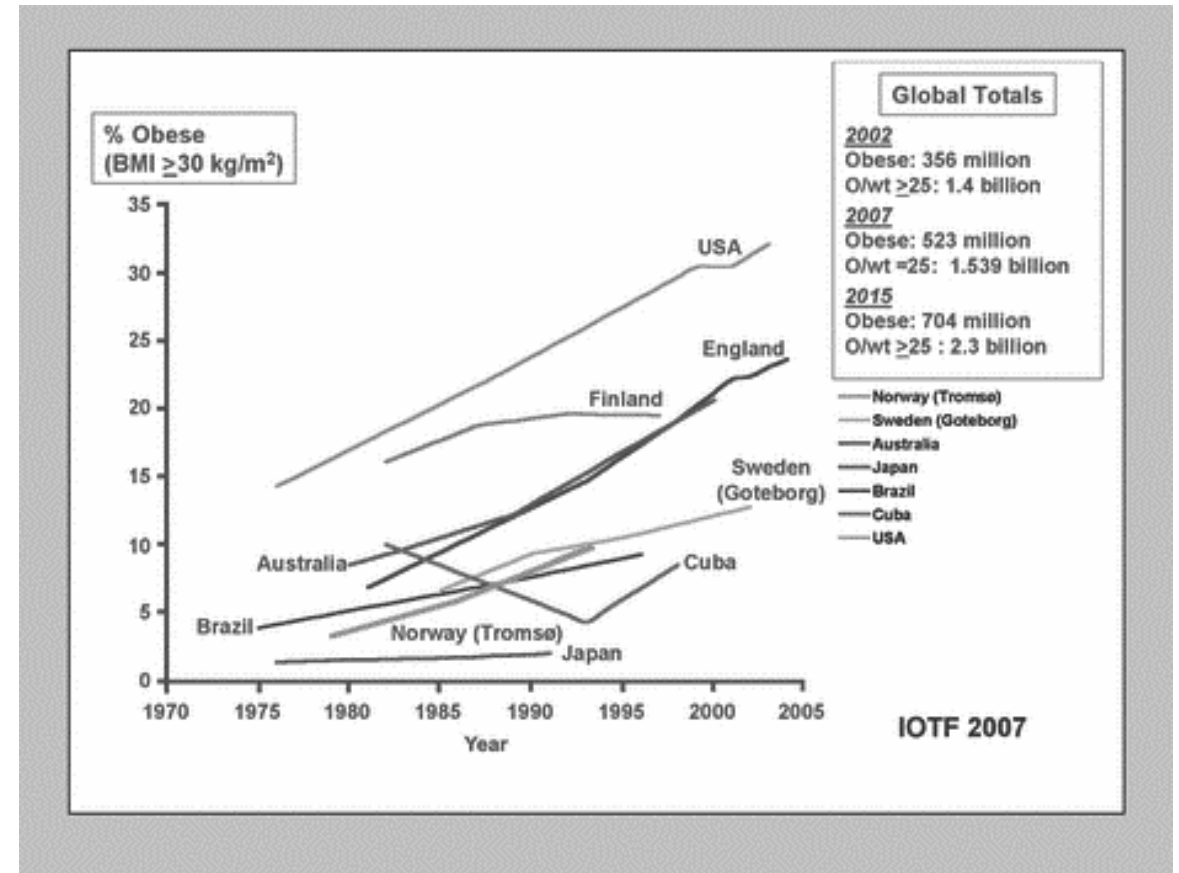
“Typical” versus “low carb” diets

- A “liberal low carb” diet has higher % carbs than the average % carbs available in the US food supply in 1994
- Consumption percentages for fat are much lower than % available i.e. available fat includes cooking oil, fat trim, etc.
- Availability of “low fat” food options has continued to increase since 1994
- Half of the people will be eating above the average % carbs
- How does 80% energy from carbs sound?

Global trends in overweight and obesity



Source: Peter Arner and Kirsty L. Spalding 2010
 Fat cell turnover in humans.
 Biochemical and biophysical research communications,
 Volume 396 Issue 1.



Source: Perna Bhasin, 2017. An Assessment of Health-Economic Burden of Obesity Trends with Population-Based Preventive Strategies in a Developed Economy
 International Journal of Public Health Science, Vol.6, No.2.

Canadian trends in overweight and obesity

Body Mass Index (BMI)	1985	2001	2011	2019 prediction
"Normal" 18.5-24.9	60.0	49.0	45.6	42.3
Above "Normal" 25+	40.0	51.0	54.4	57.7
"Obese" 30+	6.1	15.2	18.3	21.2



Actual above "Normal"
for 2012-13 was 62%

Ouch!

Source: Laurie K. Twells et al. 2014. Current and predicted prevalence of obesity in Canada: a trend analysis. CMAJ Open

Source: Health Canada "Evidence Review", 2015



Macronutrients in pork

... and a personal interlude

FROM FAT . . . TO . . . LEAN

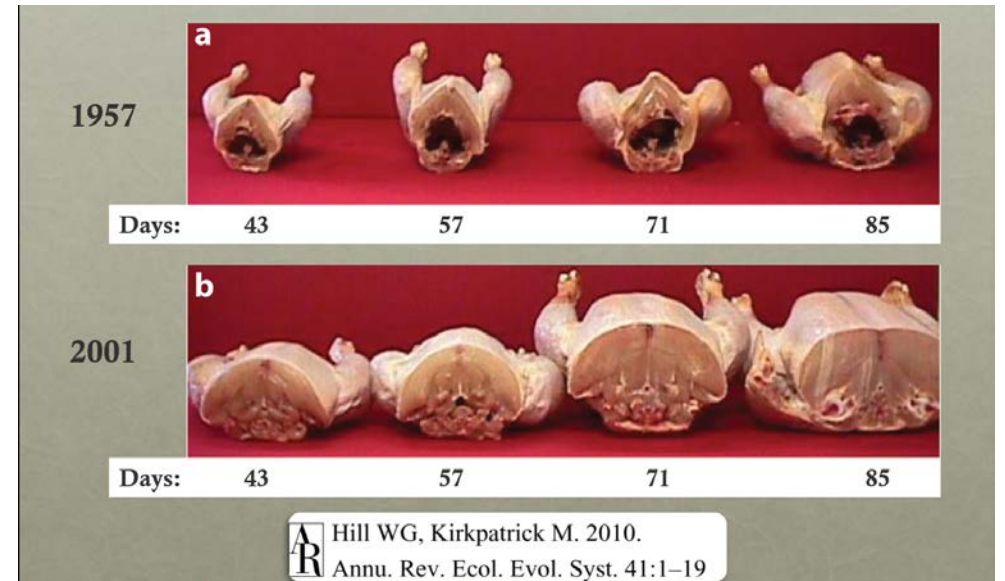
First half of the 20th century



Modern hog



Change in chickens



Photos courtesy of Todd See, N. Carolina State U

Nutrient Value of Canadian Pork (per 100 gram serving, lean only)

	Calories	Protein g	Total Fat g	SFA g	MUFA g	PUFA g	Chol mg	Thiamin mg	Ribo- flavin mg	Niacin NE	Vit B ₆ mg	Vit B ₁₂ mcg	Panto Acid mg	Iron mg	Zinc mg
Fresh Pork Cuts															
Pork tenderloin, roasted	144	28	2.5	1.1	1.1	0.5	70	1.40	0.38	15.7	0.44	0.55	1.44	1.3	2.6
Pork tenderloin, broiled	161	31	3.3	1.5	1.5	0.6	94	1.00	0.39	11.6	0.53	1.00	0.92	1.4	3.0
Leg inside round, roasted	173	32	4.2	1.6	2.0	0.6	81	1.00	0.31	18.6	0.46	0.63	1.30	1.2	3.1
Loin centre chop, grilled	174	33	3.8	1.6	1.9	0.6	69	1.20	0.23	17.7	0.54	0.66	1.30	0.8	2.2
Loin centre roast, roasted	184	29	6.8	2.5	3.0	0.5	79	0.91	0.27	11.5	0.37	0.58	0.69	1.0	2.1
Sirlion steak, grilled	193	31	6.7	2.2	2.9	0.5	92	1.03	0.40	11.3	0.54	0.84	0.91	1.2	2.7
Sirloin roast, roasted	194	30	7.2	2.6	3.4	0.5	78	0.64	0.31	11.8	0.40	0.55	0.58	1.1	2.3
Rib steak, grilled	216	30	10.0	3.6	4.6	0.6	81	0.89	0.32	11.5	0.40	0.70	0.75	0.8	2.4
Rib roast, roasted	205	30	8.4	3.3	4.0	0.8	80	0.93	0.26	17.4	0.57	1.20	1.20	1.1	3.2
Shoulder blade roast, roasted	219	28	11.0	4.3	5.0	1.3	89	0.84	0.39	14.2	0.35	1.40	1.80	1.4	4.9
Shoulder picnic roast, roasted	228	27	13.0	4.3	6.0	1.2	95	0.58	0.36	10.0	0.41	0.78	0.59	1.4	4.1
Side ribs, simmered & roasted	334	27	24.0	9.4	10.0	3.3	99	0.43	0.28	10.9	0.17	0.91	0.97	1.4	4.5
Back ribs, roasted	365	28	27.0	11.0	12.0	3.5	113	0.65	0.29	14.3	0.24	1.10	1.10	1.2	4.0
Country-style ribs, roasted	247	27	15.0	5.3	6.5	1.1	93	0.57	0.34	10.3	0.44	0.80	0.53	1.3	3.8
Lean ground pork, pan-fried	233	26	14.0	5.5	6.7	1.8	80	1.00	0.29	12.6	0.33	1.06	1.60	1.2	3.2
Medium ground pork, pan-fried	299	25	22.0	8.0	9.7	2.9	88	1.02	0.24	12.6	0.27	1.15	1.20	1.1	2.9
Cured Pork Cuts															
Back bacon, grilled	185	24	8.4	2.8	4.0	0.8	58	0.82	0.20	10.9	0.45	0.78	0.52	0.8	1.7
Bacon, 5 slices, pan-fried	182	10	16.0	5.6	7.6	1.9	27	0.22	0.09	3.9	0.09	0.56	0.34	0.5	1.0
Lean ham roasted	125	17	5.4	1.8	2.6	0.5	53	0.75	0.20	7.4	0.40	0.65	0.40	1.5	2.9
Lean deli ham	110	17	2.9	0.9	1.2	0.3	48	0.93	0.22	8.9	0.46	0.75	0.47	0.8	1.9
Cottage roll	124	15	5.9	1.7	2.3	0.5	67	0.46	0.29	5.4	0.21	1.10	0.77	0.9	2.5

Source: Canadian Nutrient File, 2007b, Health Canada
Produced by Canada Pork 2008

Proportion of energy from protein vs fat

	Protein		Fat	
	g	Energy (%)	g	Energy (%)
Tenderloin	28	83%	2.5	17%
Centre chop	33	79%	3.8	21%
Centre roast	29	65%	6.8	35%
Back ribs	28	32%	27	68%
Bacon	10	22%	16	78%
Ham	17	58%	5.4	42%



Opportunities for
the pork industry

This week from Loblaws

Loblaws

ALL CHECKOUTS OPEN
Enjoy the fast lane! Sat. & Sun. 10-6 pm

DOLLAR DAYS!
LOOK FOR MORE GREAT DOLLAR DAYS SAVINGS ON PAGES 6 AND 7!

side loin oven roast
cut from Ontario Corn Fed
Canada AAA grade beef
6.82/kg
2014/07/16 - 2014/07/19

\$4^{lb}

whole pork loin
boneless, cryovac pkg
4.41/kg

\$2^{lb}

whole chicken tray pack fresh 4.41/kg,
Schneiders Lunchmate Stackers or Kits
selected varieties 90-130 g
2014/07/16 - 2014/07/19

\$2^{lb/ea.}

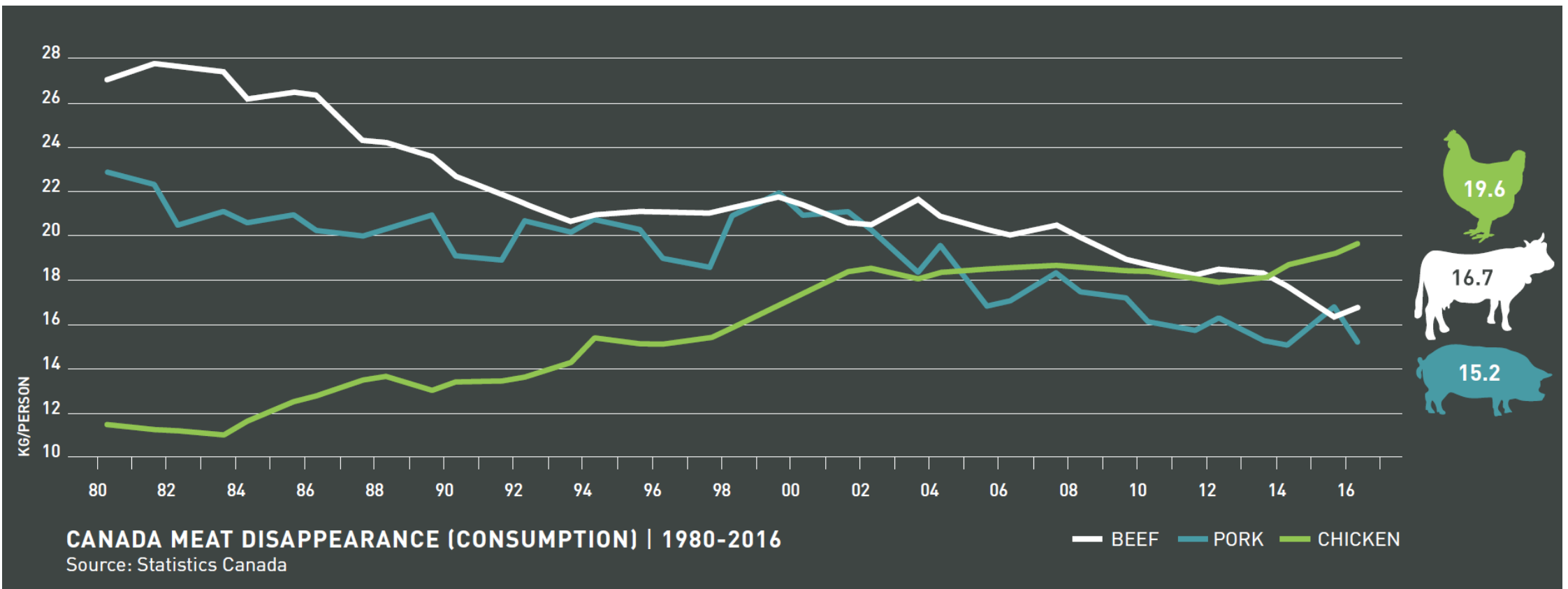
red or green seedless grapes
product of Peru or South Africa
no. 1 grade
5.51/kg
2015/01/01

2⁵⁰^{lb}

greenhouse extra large sweet
peppers 3's product of Mexico,
large white cauliflower each
product of U.S.A. or Farmer's
Market® red, yellow or russet
potatoes 10 lb bag product of
Ontario, Canada no. 1 grade
2014/07/16 - 2014/07/19

\$3

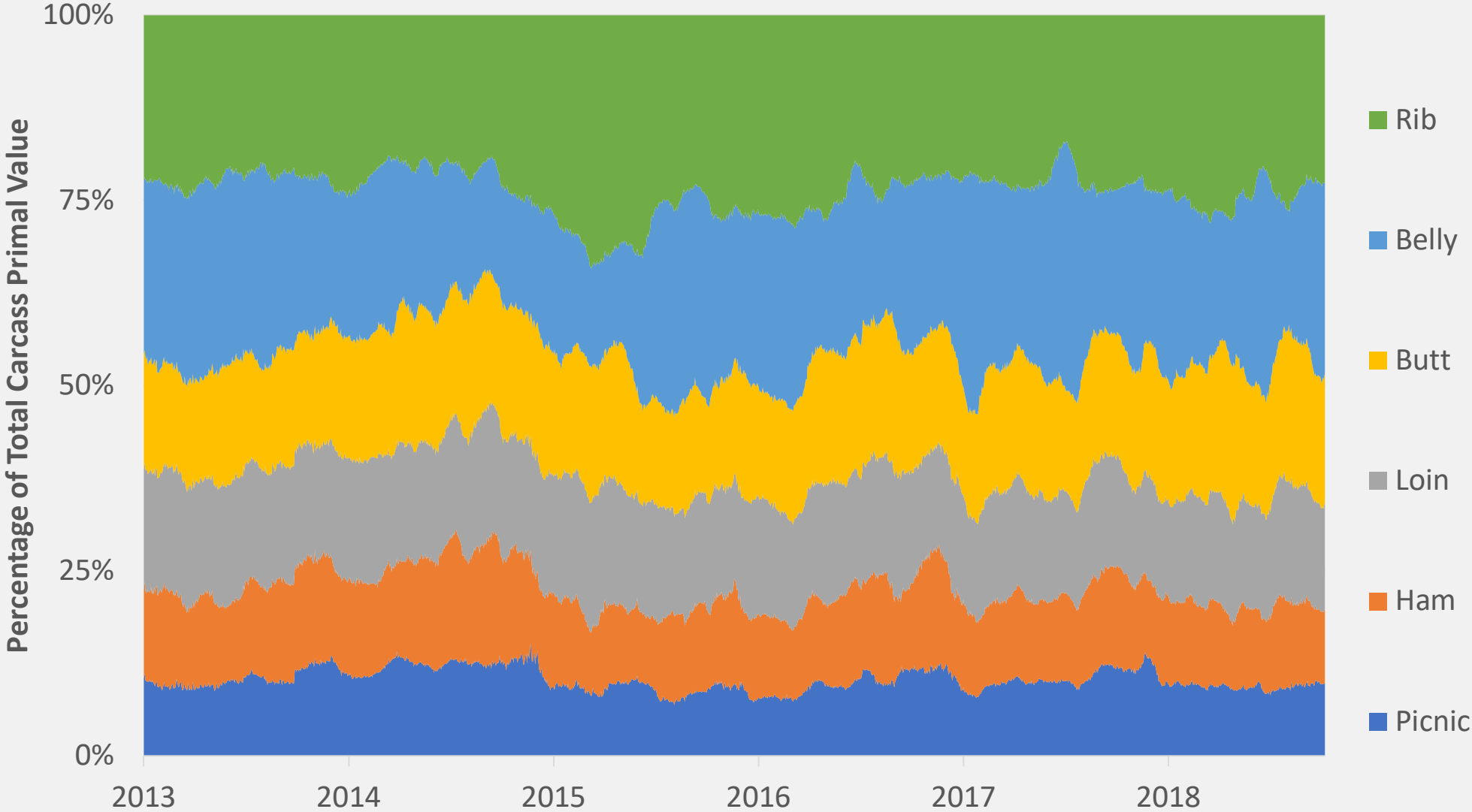
Why don't Canadians eat more pork?



USDA
wholesale
pork prices
(US\$/cwt)

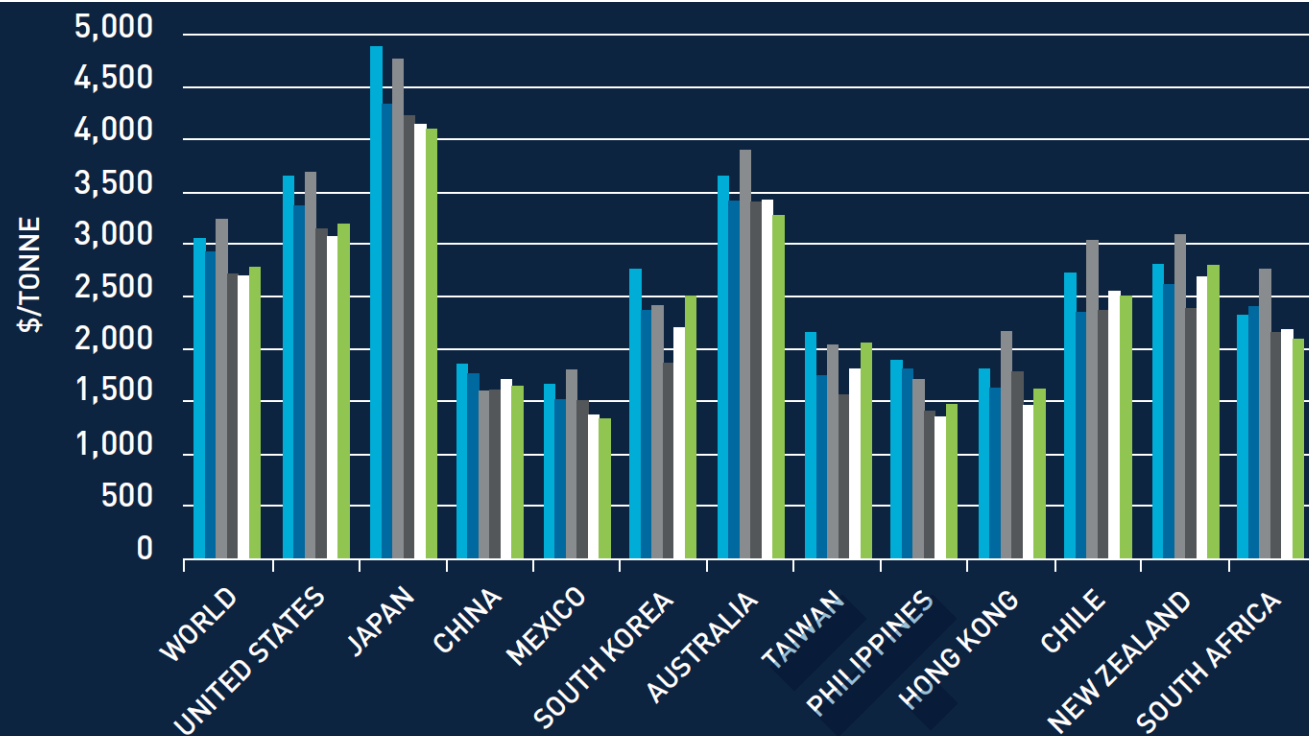
Carcass	\$68.91
Loin	\$61.86
Butt	\$77.12
Picnic	\$37.36
Rib	\$120.90
Ham	\$44.82
Belly	\$138.11

USDA Values for Pork Primals as % of Total Primal Value



(USDA, 2018)

Canada Pork International Annual Report



TOP UNIT VALUE MARKETS CANADIAN PORK EXPORTS | 2011-2016

Source: Statistics Canada

2016 2015 2014 2013 2012 2011

Support Change to Canada's Dietary Guidelines

The *Canadian Clinicians for Therapeutic Nutrition* (**CCTN**) is a group of physicians and allied health providers seeking to use nutrition to reverse metabolic disease, improve and maintain health, facilitate health professional education, and engage in dietary guidelines advocacy.

[Support Our Petition](#)

Let Parliament know that our dietary guidelines are not evidence based

www.changethefoodguide.ca

Nutrition Facts

Serving Size 1 cup (110g)
Servings Per Container About 6

Amount Per Serving

Calories Calories from Fat 30

% Daily Value*

Total Fat

Saturated Fat

Trans Fat

Cholesterol

Sodium

Total Carbohydrate

NUTRITION COALITION


For Dietary Policy Based on Rigorous Science

LEARN MORE


BLOG:



www.nutritioncoalition.us



Technology and tools for pork quality



What you
measure you can
improve

Ultrasound for carcass and pork quality

Vision systems (cameras) for carcass
attributes

Near infrared spectroscopy

Hyperspectral imaging

CT-scanners and Auto-FOM

Investing in technology and tools



Example: Novel technologies project

This project is funded by Swine Innovation Porc within the *Swine Cluster 2: Driving Results Through Innovation* research program. Funding is provided by Agriculture and Agri-Food Canada through the *AgriInnovation Program*, provincial producer organizations and industry partners.



Variations in Belly Dimensions and Fat and Lean Contents

1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



A dark blue, irregular ink blot or splash shape is centered on a white background. The blot has a textured, painterly appearance with some lighter blue and white speckles around its edges. The text "Take home messages" is written in a clean, white, sans-serif font, centered within the dark blue area.

Take home
messages

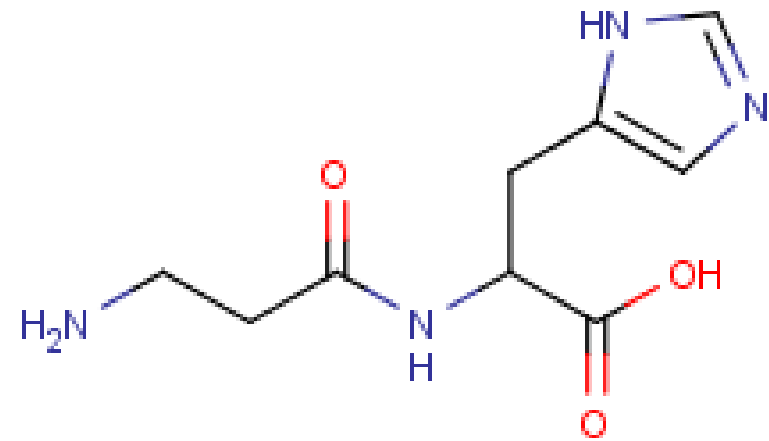
Much more than a good source of protein

- Other components, especially fat, are a big part of meat quality
- Fat may be the most important opportunity for quality improvement
 - Nutritional value related to obesity and common human diseases
 - Most valuable cuts are ones with more fat
 - High value export markets want more fat
- As more consumers discover that more fat may be healthier (and tastier!) demand for pork will move up
- Pigs are good at turning unhealthy carbs into high quality fat
- The investments in technology to evaluate pork quality position Canada well to adapt our hogs, processing and marketing



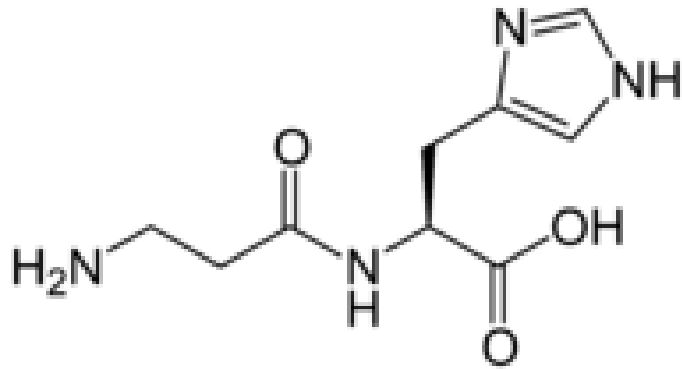
Bonus material

Pork: the best
source of
carnosine?



Carnosine

What is Carnosine...



- Muscle and excitable tissues (brain, heart, etc)
- 1st bioactive peptide discovered (Russia, 1890)
- Ancient, relatively unknown... » Forgotten, enigmatic, intriguing, remarkable »
- Unique multi-effect animal protection system (pleiotropic)
- Promising therapeutic molecule

- **Could change the whole portrait of meat consumption... »Game changer!! »**
- **Only available in meat (not plants)**

- Contact Claude Gariépy for more information
- Claude presented about carnosine at the Canadian Meat Council conference in 2018

If, like me, you find more fat is better

Look for fat versus carbs and protein on the nutrition facts label



Bacon wrapped loin stuffed with cream cheese



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RECYCLÉ
Carton fait à partir de matériaux recyclés
Board made from recycled material
FSC® C104002

**Valeur nutritive
Nutrition Facts**
pour 1 contenant (100 g) / Per 1 container (100 g)

Teneur Amount	% valeur quotidienne % Daily Value
Calories / Calories 120	
Lipides / Fat 4 g	6 %
saturés / Saturated 2,5 g + trans / Trans 0,1 g	13 %
Cholestérol / Cholesterol 15 mg	
Sodium / Sodium 35 mg	1 %
Glucides / Carbohydrate 13 g	4 %
Fibres / Fibre 1 g	4 %
Sucres / Sugars 12 g	
Protéines / Protein 7 g	
Vitamine A / Vitamin A	4 %
Vitamine C / Vitamin C	4 %
Calcium / Calcium	10 %
Fer / Iron	0 %

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Cholestérol / Cholesterol 15 mg	
Sodium / Sodium 30 mg	1 %
Glucides / Carbohydrate 14 g	5 %
Fibres / Fibre 0 g	0 %
Sucres / Sugars 14 g	
Protéines / Protein 7 g	
Vitamine A / Vitamin A	4 %
Vitamine C / Vitamin C	0 %
Calcium / Calcium	10 %
Fer / Iron	0 %

Tasty desserts
don't need
to be 90%
carbs



Eat more
pork!



Ontario Pork Congress 2018

WHAT DO WE LEARN FROM COWS,
HIPPOS AND ELEPHANTS?



It's impossible to reduce weight by
eating green grass, salads, and walking.

Famous Quotes

Should we consider meat a health food?

“Yes, but it would be even better if you put back more fat”

Gary Taubes, 2018

“Eating fat doesn’t make you fat any more than eating
vegetables doesn’t make you green”

- Unknown

Thanks for your attention!