

# **Cultural and Historical Lessons in the Use of Low Carbohydrate Diets**

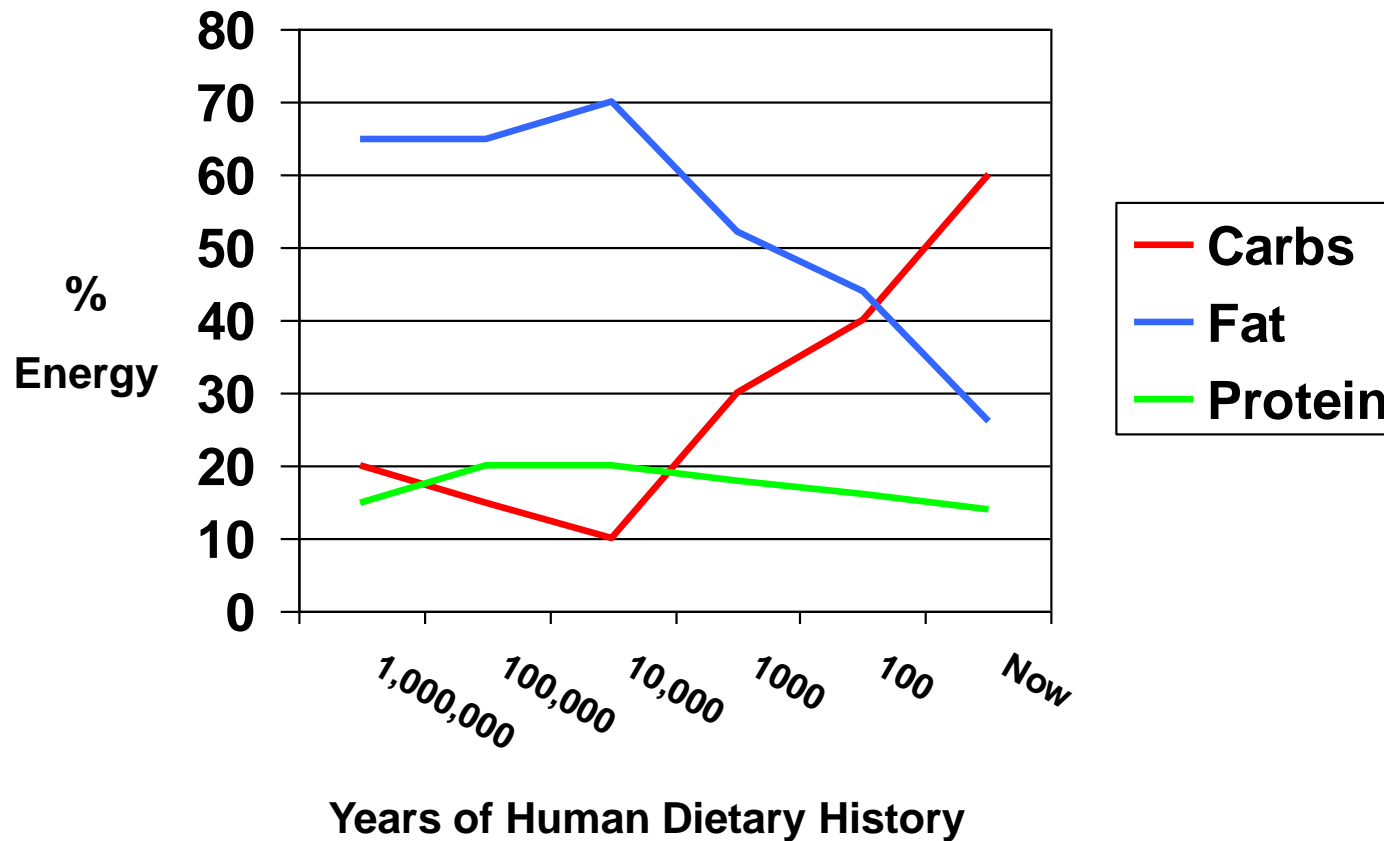
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# Historical Low Carb Lessons

For most of the span of human evolution, dietary carbohydrate was a variable and often very limited contributor to the total energy intake of our ancestors.

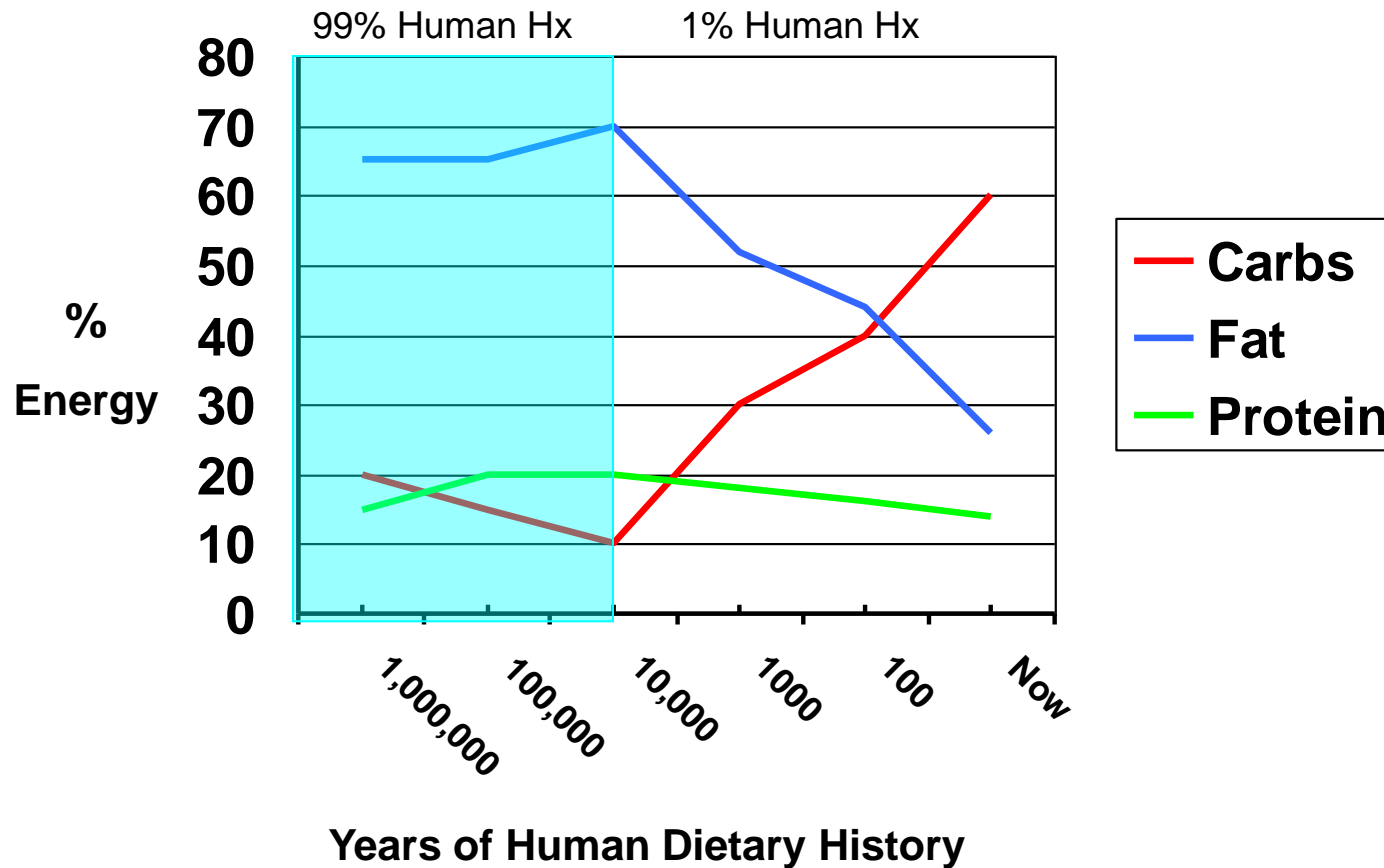
# Human Dietary Evolution

## Fertile Crescent and China



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# Historical Low Carb Lessons

- With the advent of agriculture 6-8,000 years ago, starches and sugars have progressively displaced fat as our primary energy sources.
- However this profound dietary fuel shift did not equally penetrate all regions and cultures.
- Up until a century ago, some hunting, fishing, and herding cultures maintained their aboriginal dietary practices
- In some cases, scientifically literate observers documented the composition of these hunter/herder diets before they were supplanted by agricultural foods.



# Historical Low Carb Lessons

John Rae, an Edinburgh-trained surgeon joined Hudson's Bay company in 1839.

From 1844-55, he charted 1500 miles of the northwest passage in the company of First Nations and Inuit Guides. For most of this period, he "ate off the land".

His principal food source in his wilderness travel was hunting.

His back-up food was pemmican, a mixture of dried meat and fat – a traditional processed food that could be stored for years.

The energy composition of pemmican was 20-25% protein and 75-80% fat.

Rae's Arctic Correspondence - 1844-55. Hudson's Bay Record Soc.  
London 1953



# Historical Low Carb Lessons

Prof. V. Stefansson, a Harvard trained anthropologist, lived and traveled extensively among the Inuit from 1905-17. His writings so scandalized the nascent nutrition establishment that he had to submit to 12-months' "incarceration" in 1928 in order to salvage his veracity, eating only meat and fat to prove that he would not become ill.





# Historical Low Carb Lessons

## What Stefansson Ate:

- Protein 115 grams/day (15-20%)
- Fat > 200 grams/day (>80%)
- Carb < 10 grams/day (<2%)
- From:
  - Meat, fish, poultry (with broth)
  - Brains
  - Marrow
  - Liver and kidney

Source: McClellan W, et al. JBC  
87:651,1930)



# Historical Low Carb Lessons

In 1878-80, Dr. Frederick Schwatka traveled 3000 miles across the Canadian Arctic with two Inuit families. His diary was lost until 1965, then published into obscurity.



# Historical Low Carb Lessons

## Ketoadaptation Defined - 1880

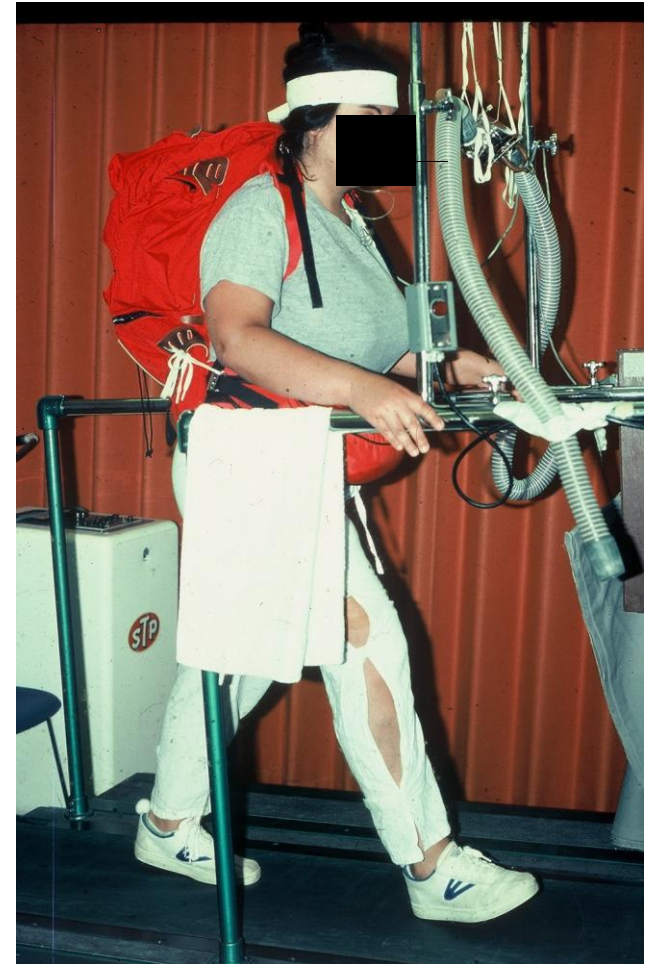
“When first thrown wholly upon the diet of reindeer meat, it seems inadequate to properly nourish the system and there is an apparent weakness and inability to perform severe exertive, fatiguing journeys. But this soon passes away in the course of 2-3 weeks.” Schwatka, F. The Long Arctic Search. E. Stackpole, Ed, The Marine Historical Assoc, Mystic CT 1966.





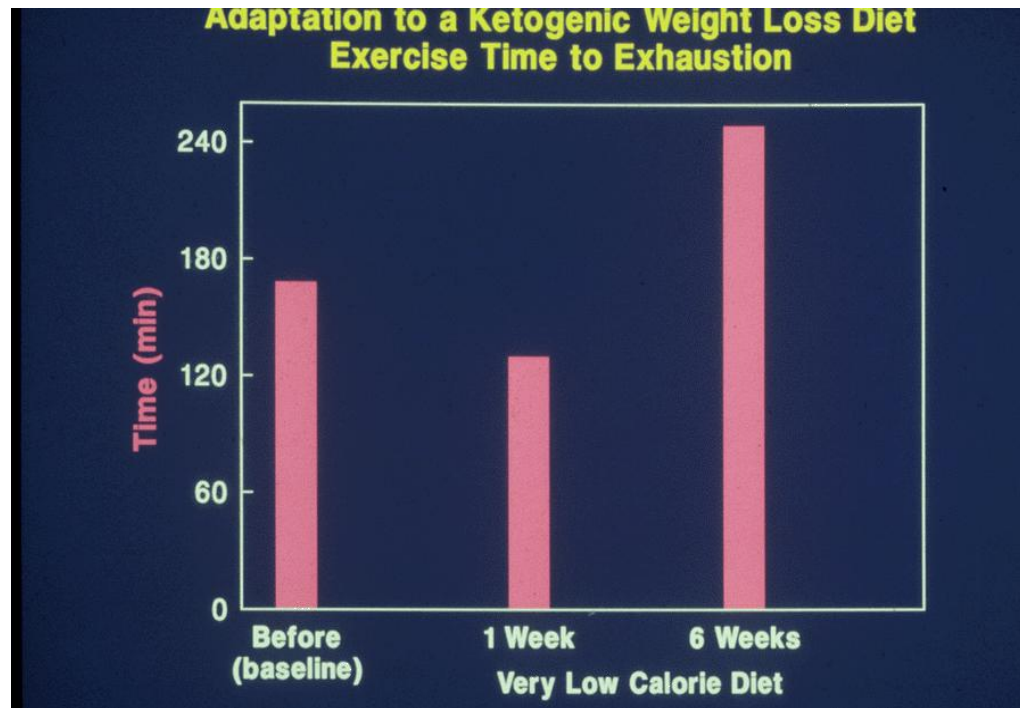
# Keto-adaptation Demonstrated Vermont Study

- 6 subjects “locked up” for 7 weeks
  - After a week of baseline studies, all subjects ate a meat/fish/poultry supplemented fast (~600 kcal/d) with supplemental minerals and vitamins
  - Endurance performance was assessed at baseline, 1 week, and 6 weeks of the ketogenic diet
  - At 6 weeks, each individual’s weight loss was compensated by a backpack loaded to recreate their starting weight.
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- (Phinney et al JCI 66:1152, 1980)



# Keto-adaptation Demonstrated Vermont Study

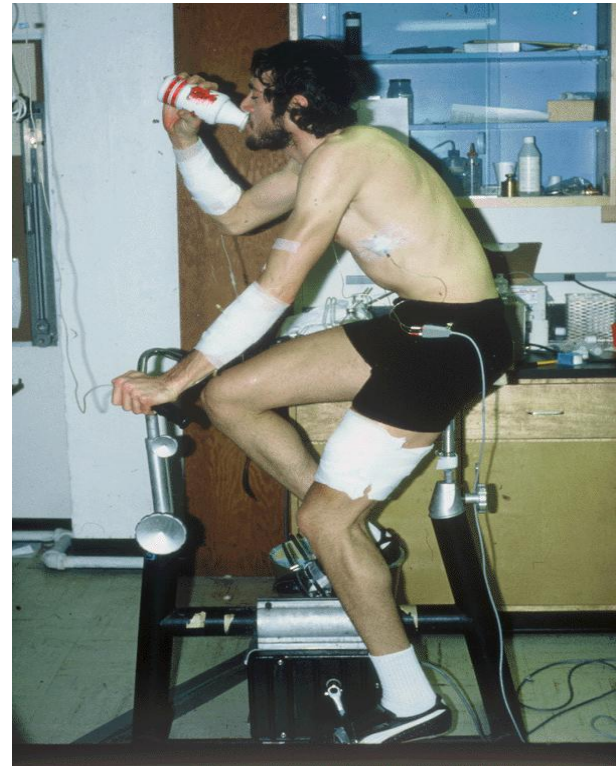
- Given 90 grams per day of protein as meat, adequate salt and potassium, trace minerals and vitamins, obese humans adapt to recover full endurance performance within 6 weeks (*Phinney et al JCI 66:1152, 1980*)



# Keto-adaptation Confirmed MIT Study

- The “Vermont Study” result was verified for a full-calorie (eucaloric) ketogenic diet given to 5 highly fit and lean bicycle racers. Key management factors were protein content, type of dietary fat, major & trace minerals
- 4 weeks of adaptation allowed between baseline and final endurance tests
- Diet Composition patterned after Stefansson
  - 15% protein
  - 80+% fat
  - < 2% carbohydrate

(Phinney et al, *Metabolism* 32:769, 1983)



# MIT Study Performance Parameters

	<u>Baseline</u>	<u>4 Wks Ketosis</u>
VO <sub>2</sub> max (L/min)	5.1	5.0
Endur @65% VO <sub>2</sub> max (min)	147	151
RQ Endur	0.83	0.72*
Pre Musc Gly (mMol/kg)	143	76
Post Musc Gly	56*	53*
<b>WBC</b> (x10 <sup>9</sup> ) ( <i>biomarker of inflammation</i> )	<b>5.2</b>	<b>4.5*</b>

# Does Low Carb Stunt your Growth?



152. Tchong-tas-sab-bee, Black Dog.



153. Tal-lee.

**In the 1830's, George Catlin traveled west of the Mississippi and painted hundreds of Native Americans while they still lived their pre-contact lifestyle. Black Dog and Tal-lee, Osage warriors who ate mostly buffalo, were both between 6'6" and 7' tall.**

(Catlin, G. Letters and notes on the manners, customs, and conditions of North American Indians.  
Re-printed by Dover Inc, NY, NY, 1973)



# Historical Low Carb Lessons

In 1931, a pair of British medical scientists, published a comprehensive study comparing the health status of two African tribes – the Masai and the Kikuyu.

Orr JB, Gilks JL. Studies of Nutrition: the physique and health of two African tribes. Medical Research Council Special Report No. 155, London 1931.



# Historical Low Carb Lessons

- Masai warriors ate only three foods:
  - Meat 1.2 kg per day
  - Milk 2 liters per day
  - Blood 50 ml per day
- Masai women ate gathered leaves and plants along with meat and milk
- The Kikuyu were subsistence farmers consuming mostly vegetarian fare
- Masai men were 5" taller and women 3" taller than the Kikuyu men and women living in the same region
- Masai men were typically larger in the chest and narrower in the abdomen than Kikuyu men.

# Historical Low Carb Lessons

- From the Masai in Africa, the nomadic people of the American Great Plains, to the Inuit and First Nations people of Canada, there are interesting lessons to be learned about what to eat when carbohydrate is limited.
- As a rule, whether hunter or herder, the nutrient that was treasured was fat, typically providing the majority of the daily energy intake.
- Cultural practices of obtaining and storing fat were often highly refined (pemmican, oolichan grease).
- Protein, on the other hand, was consumed in relative moderation, ranging from 15-30% of energy intake.

# Historical Low Carb Lessons

- Indigenous knowledge and practice can inform our search for solutions to modern chronic disease problems in both indigenous and non-indigenous populations.
- Specifically:
  - Human from very diverse locations have safely existed for millennia with little dietary carbohydrate
  - Carbohydrate restriction need not impair:
    - physical performance
    - growth and physical development

# Historical Low Carb Lessons



Mt Shasta 4,300 meters - Low Carb Climb - June 2005



# Human Dietary Evolution

## Inuit, Lakota, Kiowa

