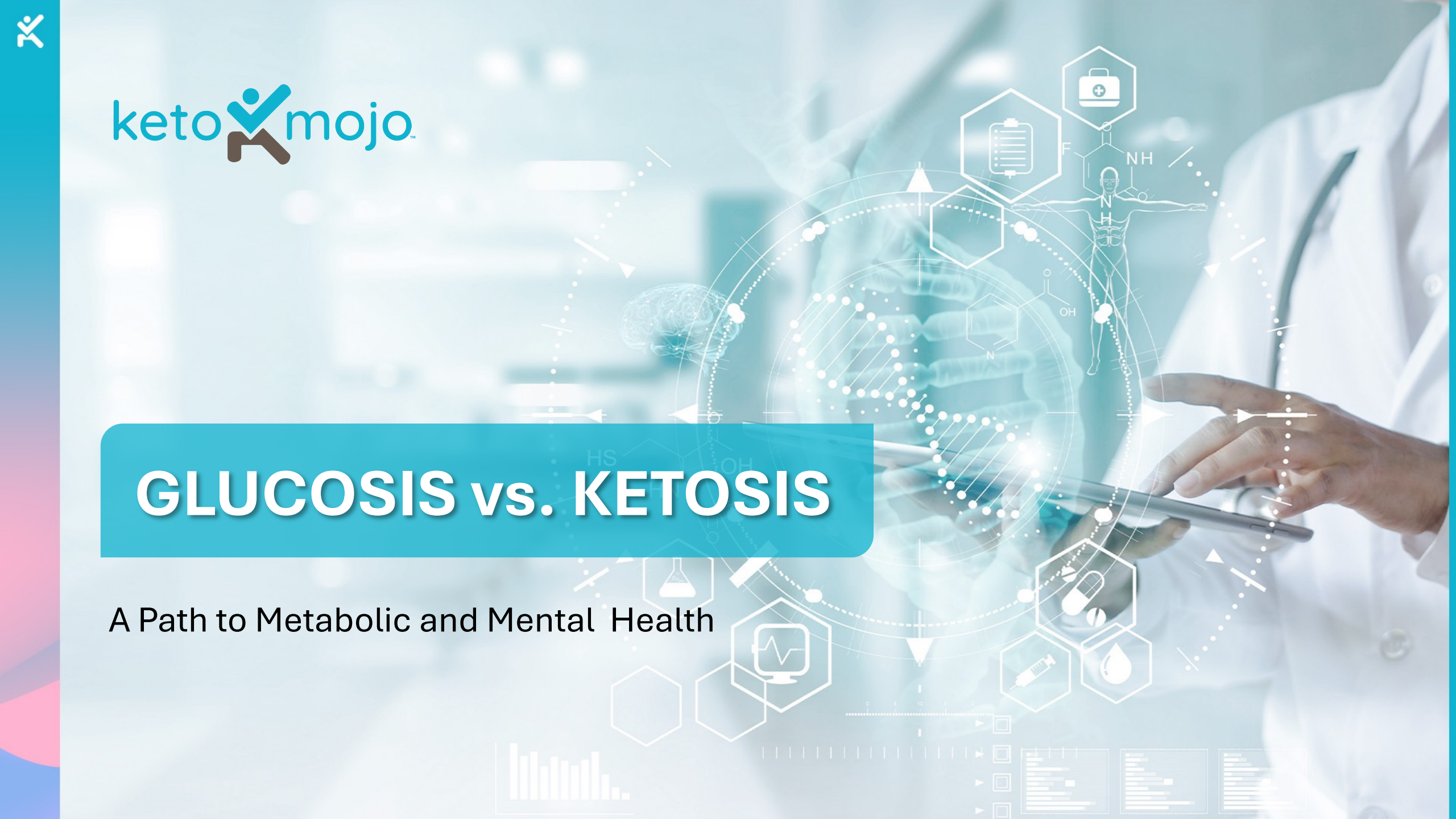
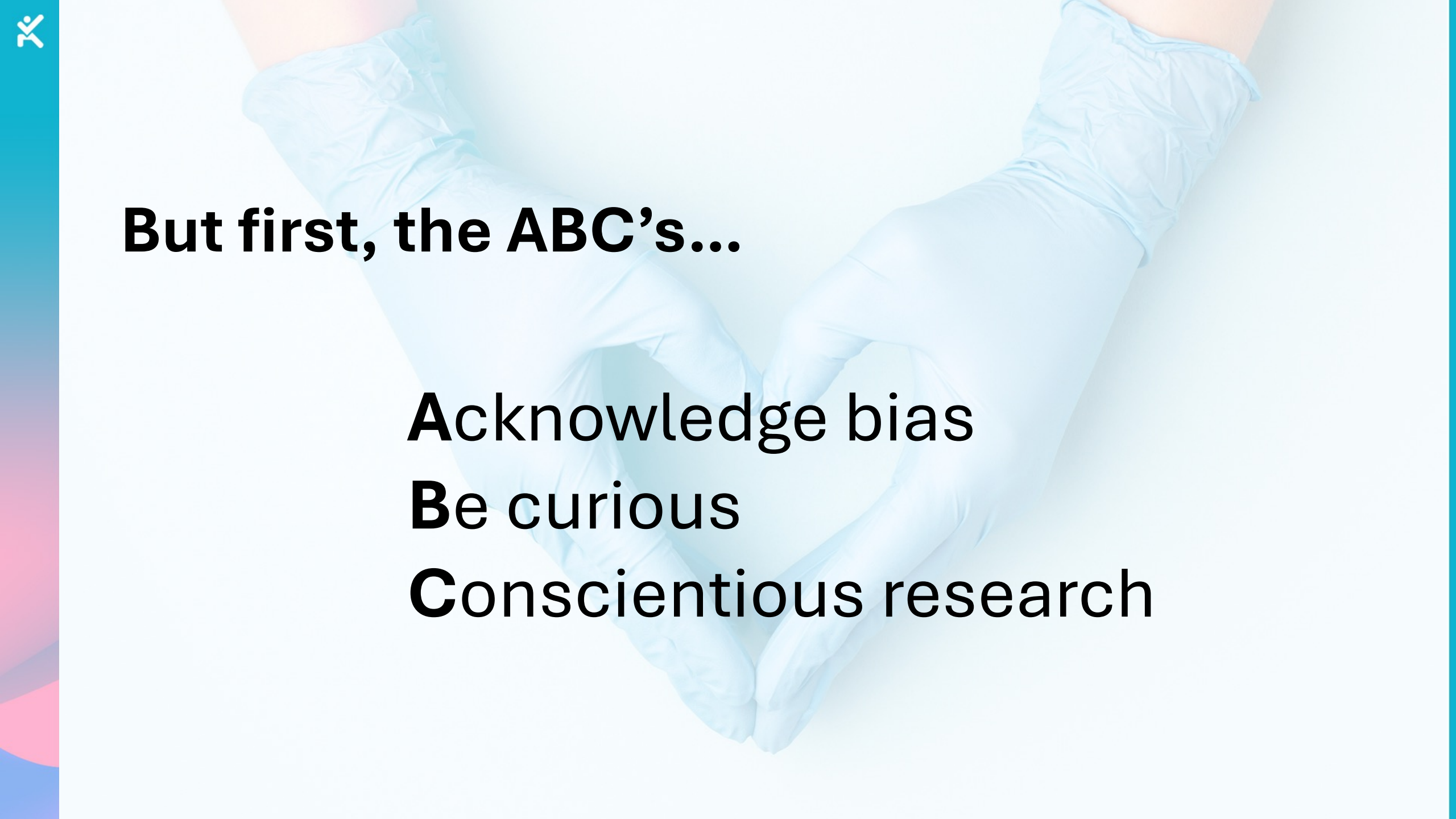
keto mojo

GLUCOSIS vs. KETOSIS

A Path to Metabolic and Mental Health





But first, the ABC’s…

Acknowledge bias

Be curious

Conscientious research

Dorian Greenow

Nutritional Ketosis since 2015

Founder Keto-Mojo

Chairman of The Ketogenic Foundation (Non-Profit)

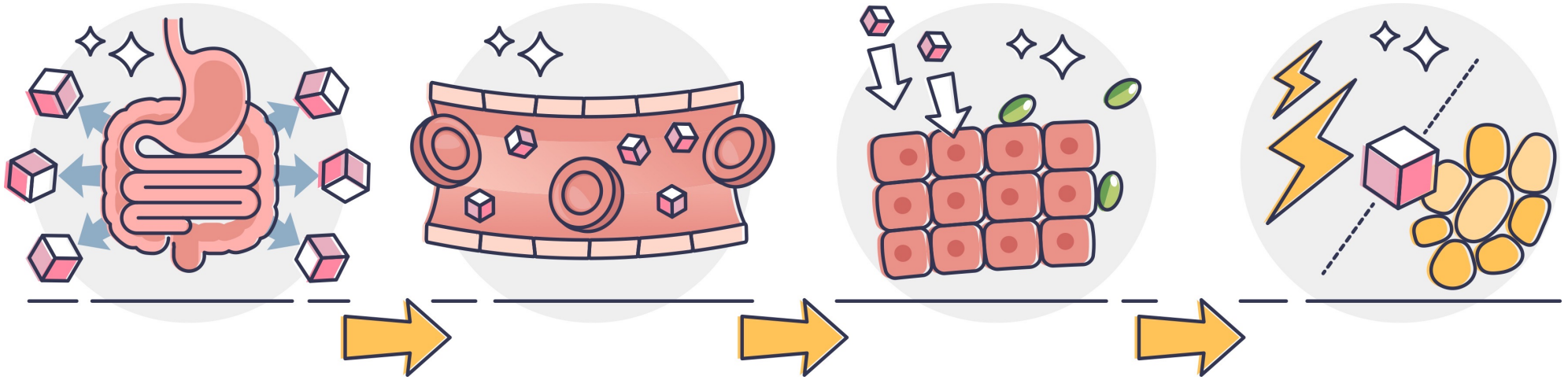
Advisory Board Member Keto Live Center (Non-Profit)

Advisory Committee Metabolic Terrain Institute of Health (Non-Profit)

Disclaimer, conflict of interest / bias

Glucosis vs Ketosis

Glucosis is a metabolic fed state that occurs when your body primarily utilizes glucose for energy. Glucose sources are diet, glycogen stores, and gluconeogenesis in the liver.



During digestion, carbs break down into simple sugars.

They are absorbed into the bloodstream as glucose.

Glucose is sent to the body's cells by the hormone **insulin**.

Cells use glucose as fuel. Unused glucose is stored as fat.

Glucosis vs Ketosis

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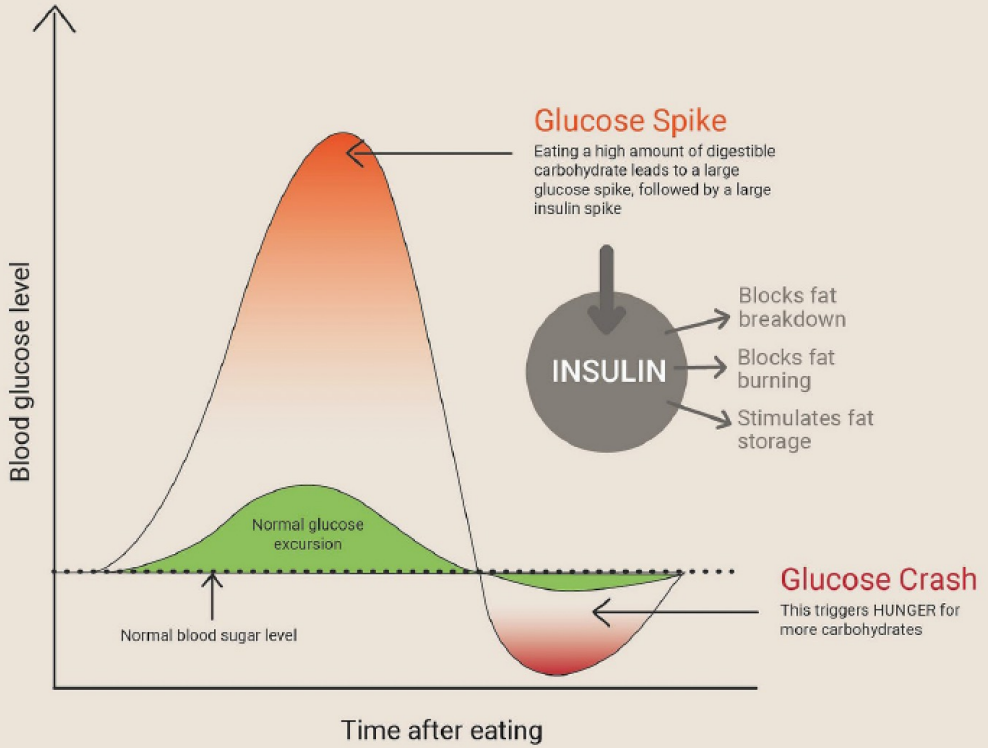
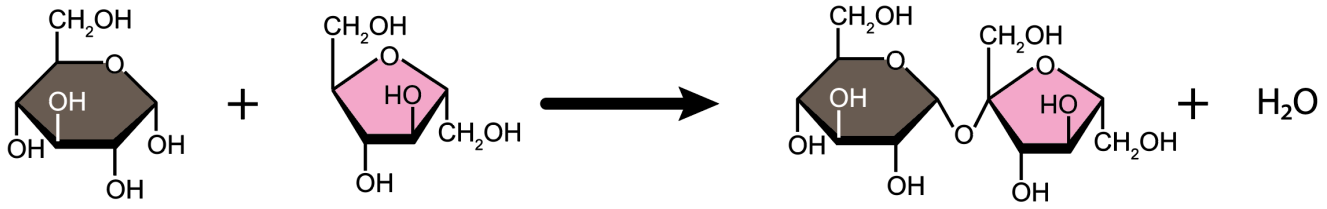
In this state, Insulin levels are high

- ✗ Access to stored fat is inhibited
- ✗ No ketones produced
- ✗ The brain depends on glucose for energy



Sugar =

Glucose + Fructose

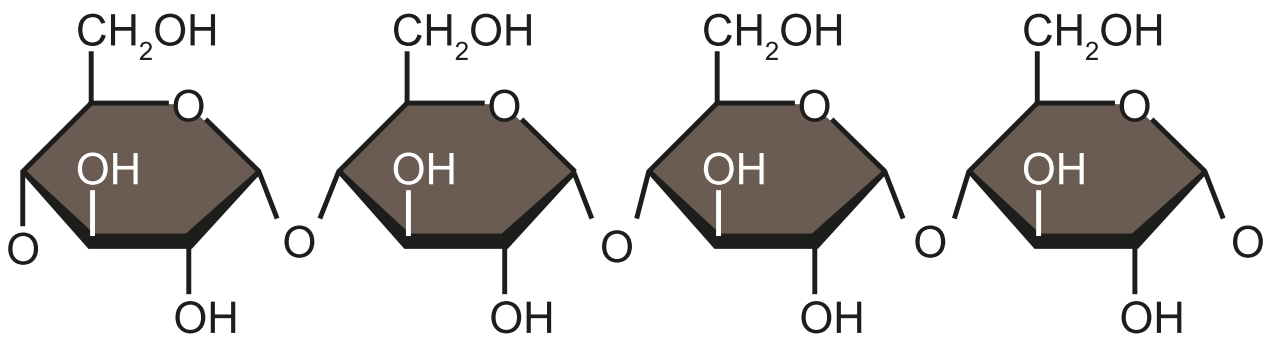


Starch =

Long Chains of Glucose

Complex carbohydrates are simply glucose holding hands.

High speed train or slow freight train either way it will still hit you!



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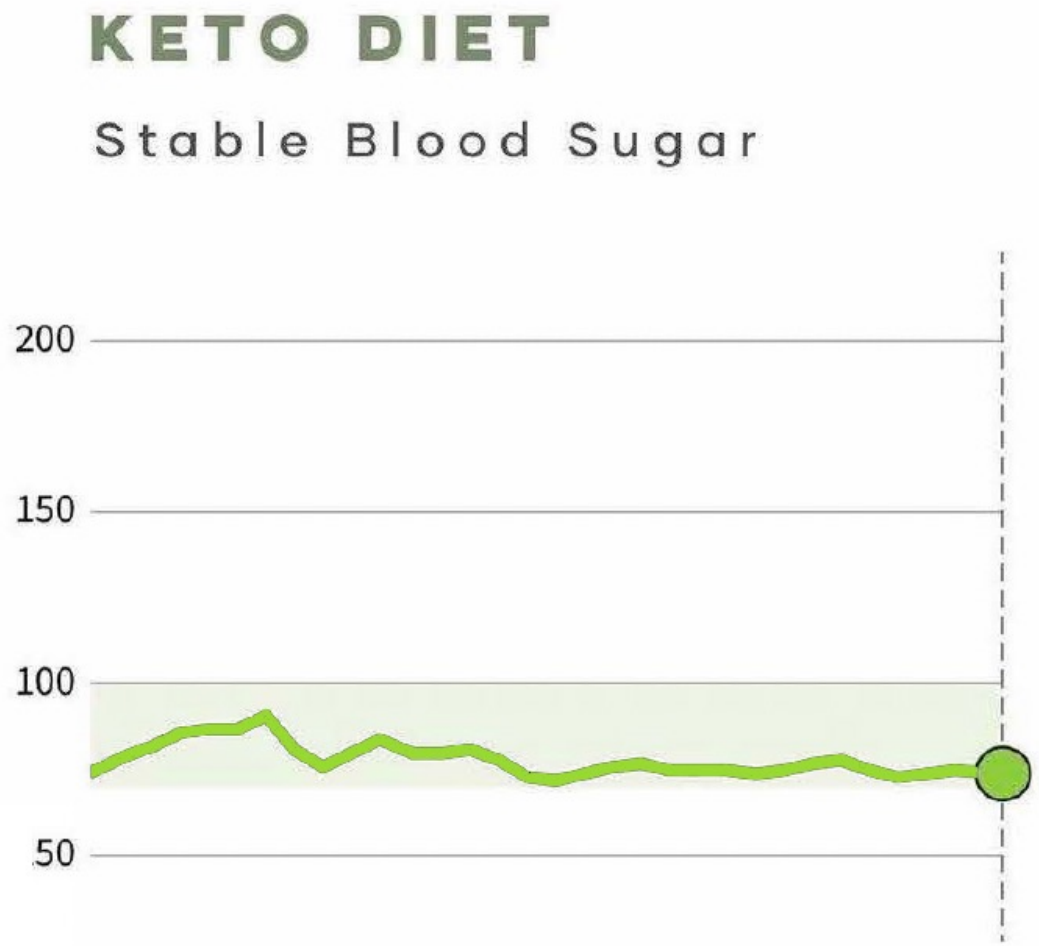
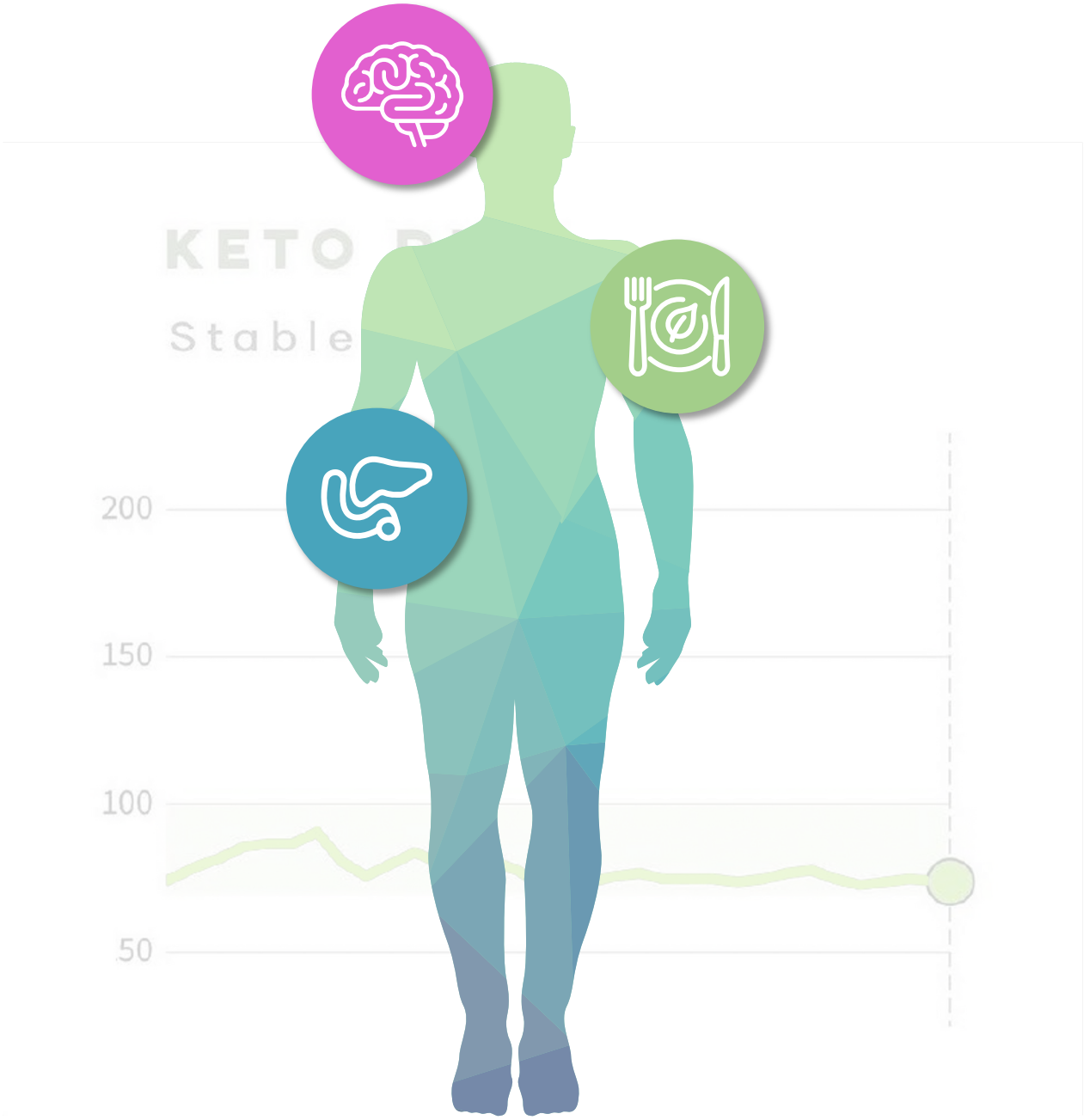


Glucosis vs Ketosis

Ketosis is a metabolic state that occurs when your body primarily utilizes fat for energy (dietary or body fat).

In this state, Insulin levels are low

- ✓ Access to stored fat
- ✓ Liver produces a fuel mix of glucose and ketones
- ✓ Optimal energy supply for the brain



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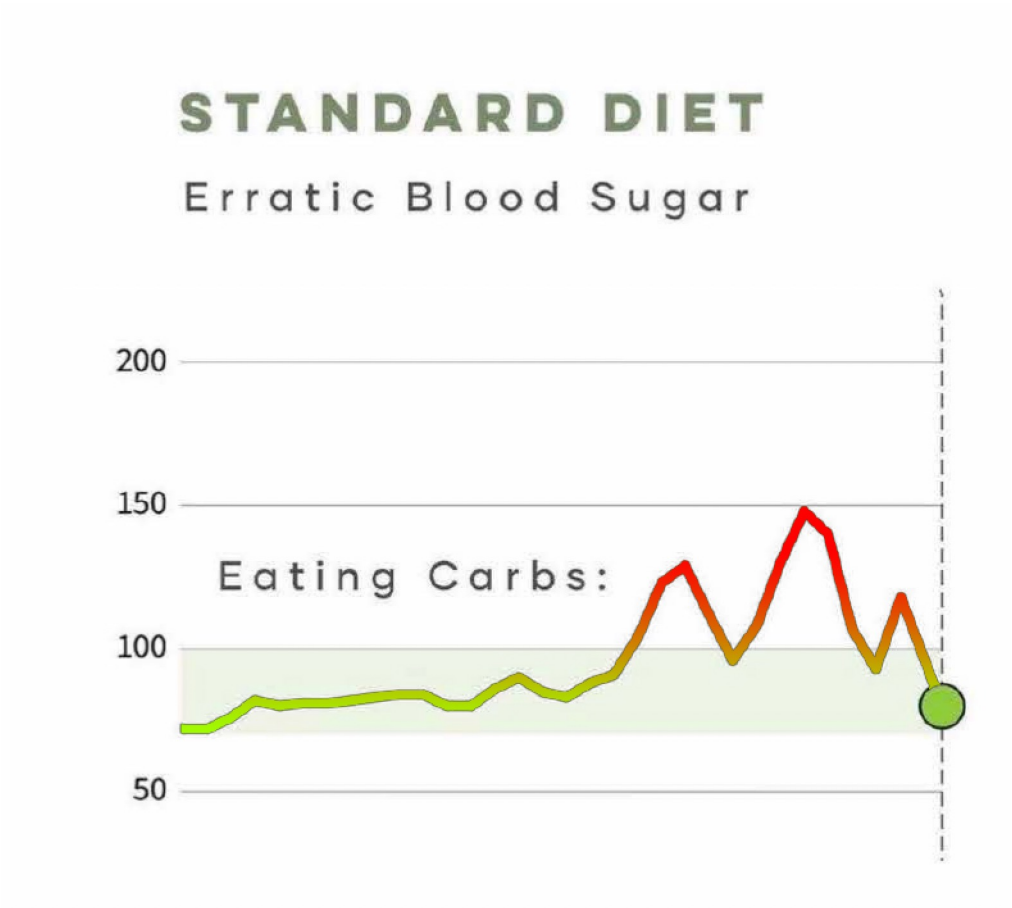
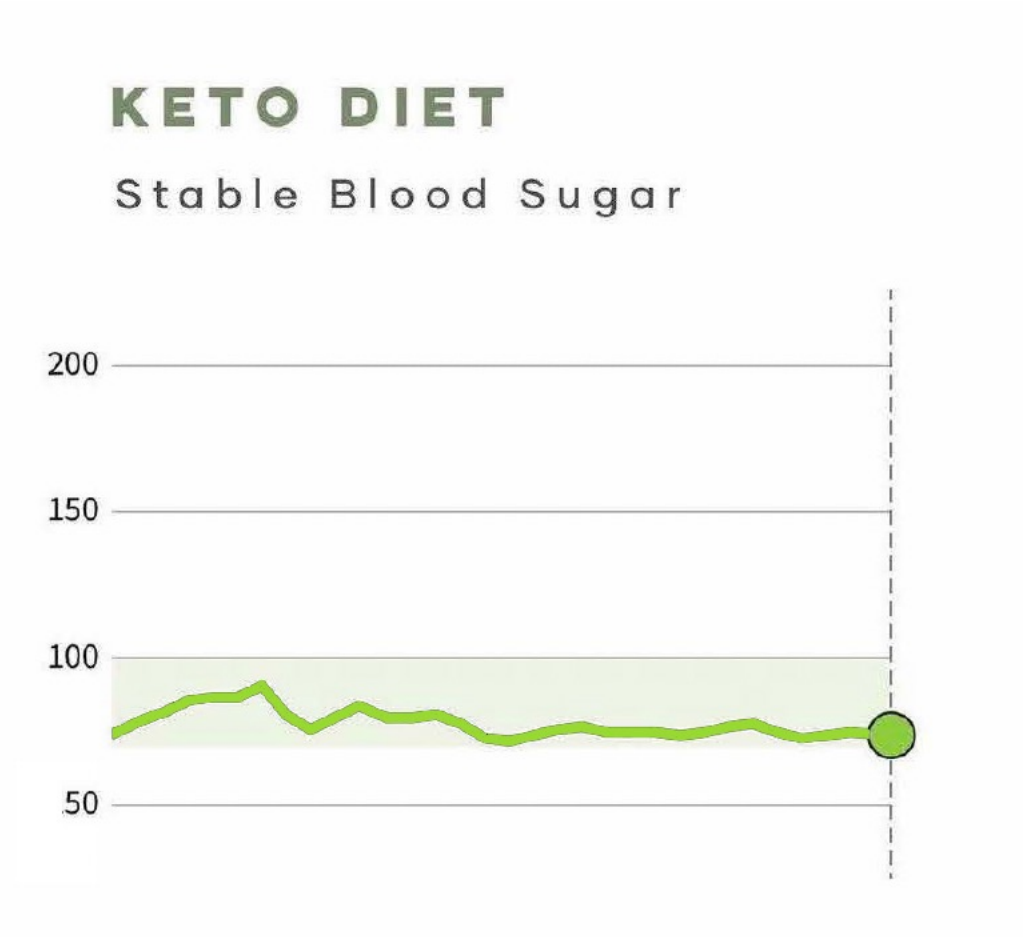
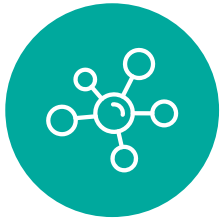




Ketones are more than fuel!

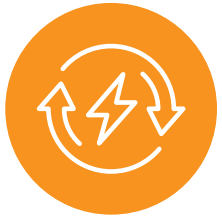


Signaling Molecules

Acting similarly to hormones in signaling and influencing cellular processes, including gene expression, inflammation, and metabolism.

Transport and Systemic Effects

Like hormones, ketones are transported via the bloodstream and affect different organs such as the brain, muscles, and heart.



Regulatory Effects on Metabolism

Playing a regulatory role in the metabolic state, particularly signaling the shift to use fat as a primary energy source.

Influence Various Physiological Functions

Impact extends to physiological aspects such as neurological health, inflammation, oxidative stress, and potentially lifespan

Ketones are more than fuel!

And are starting to gain recognition as Novel Hormones

frontiers | Frontiers in Endocrinology

Hepatokines, bile acids and ketone bodies are novel Hormones regulating energy homeostasis

Gabriella Garruti[1]*, Jacek Baj[2], Angelo Cignarelli[1], Sebastio Perrini[1] and Francesco Giorgino[1]

[1]Unit of Internal Medicine, Endocrinology, Andrology and Metabolic Diseases, Department of Precision and Regenerative Medicine, University of Bari Aldo Moro, Bari, Italy, [2]Department of Anatomy, Medical University of Lublin, Lublin, Poland

DOI 10.3389/fendo.2023.1154561

Effects of Glucosis

During glucosis the body is a high-insulin metabolic state that locks the metabolism into primarily utilizing glucose for energy.

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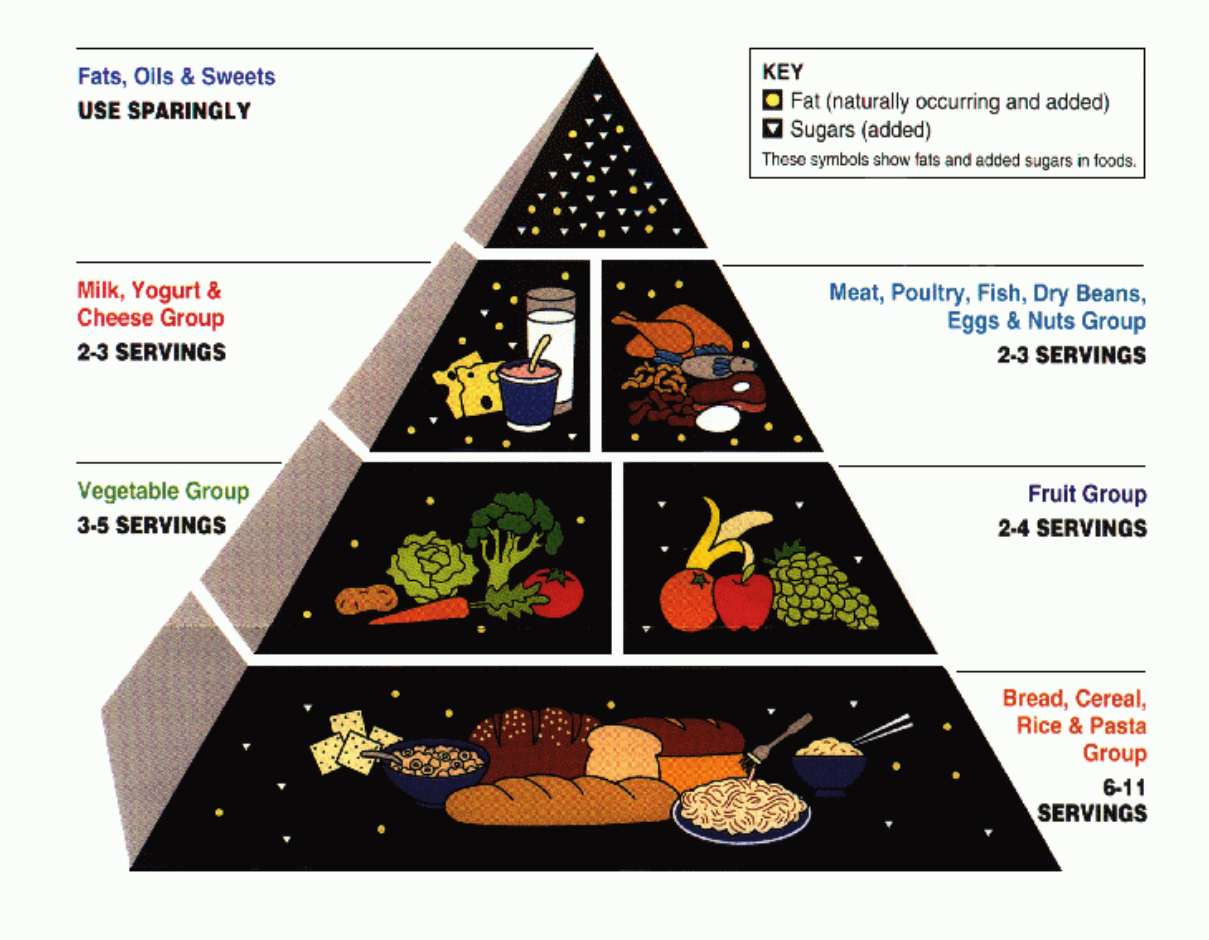

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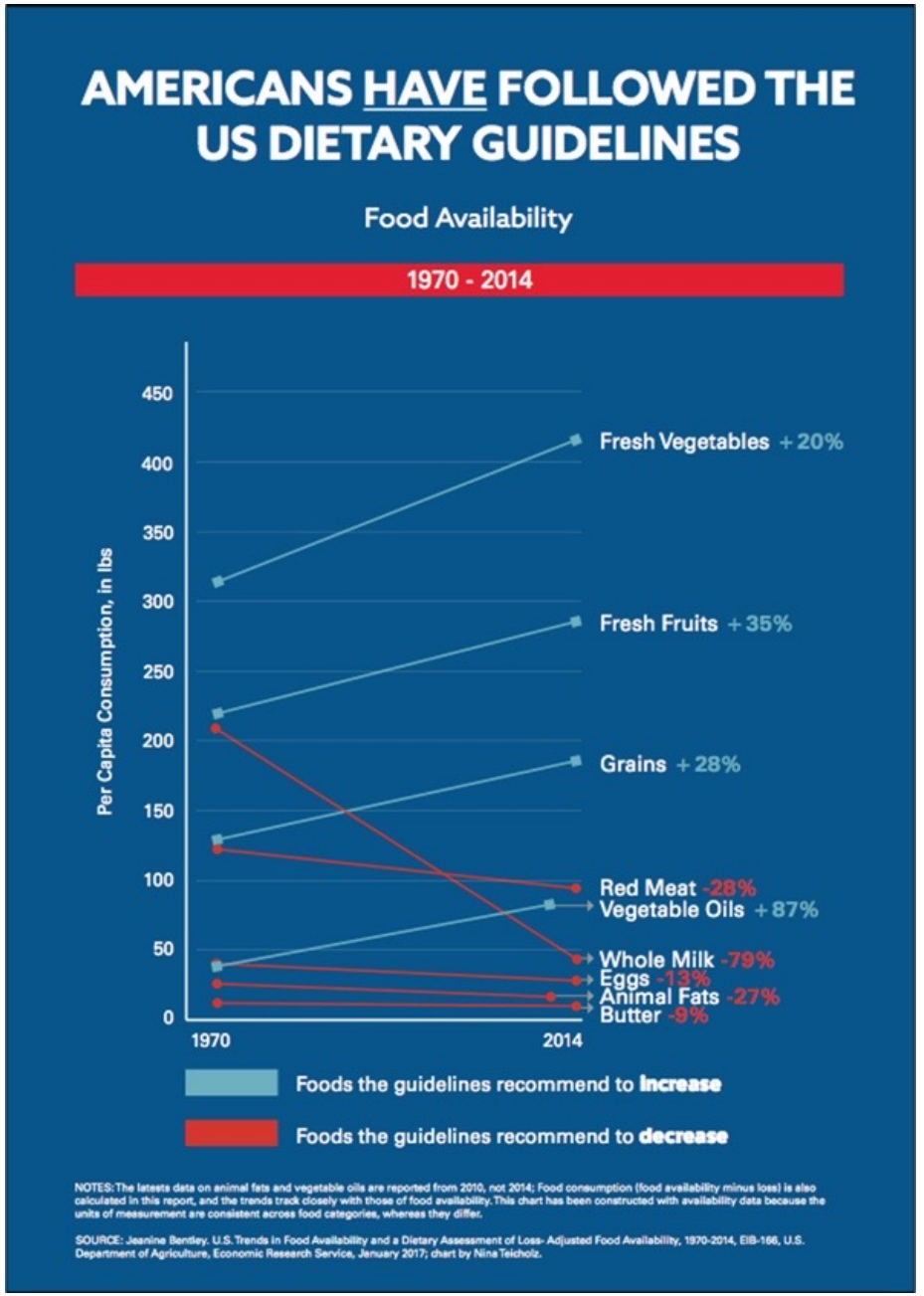

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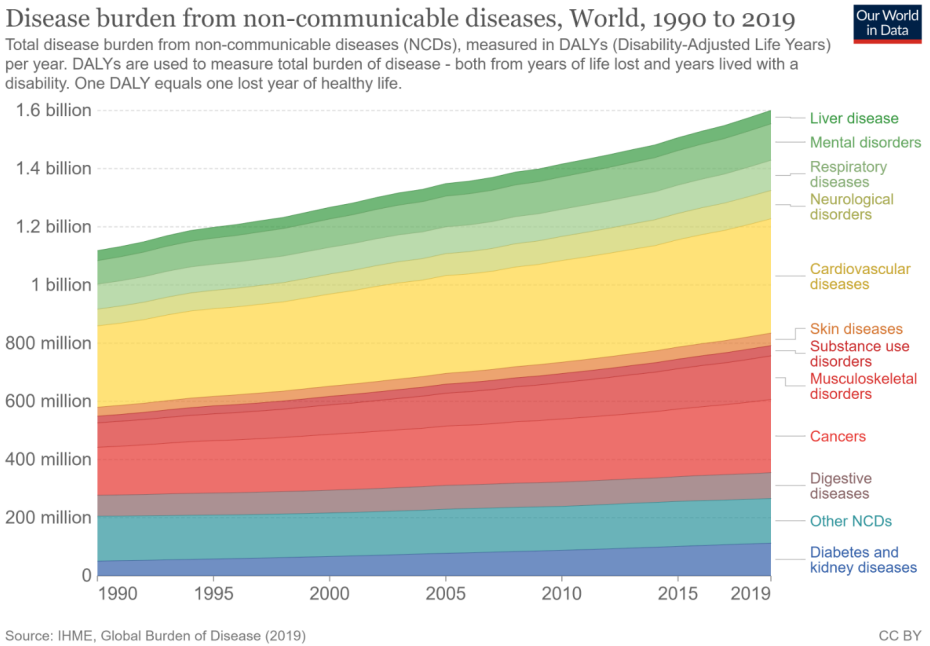
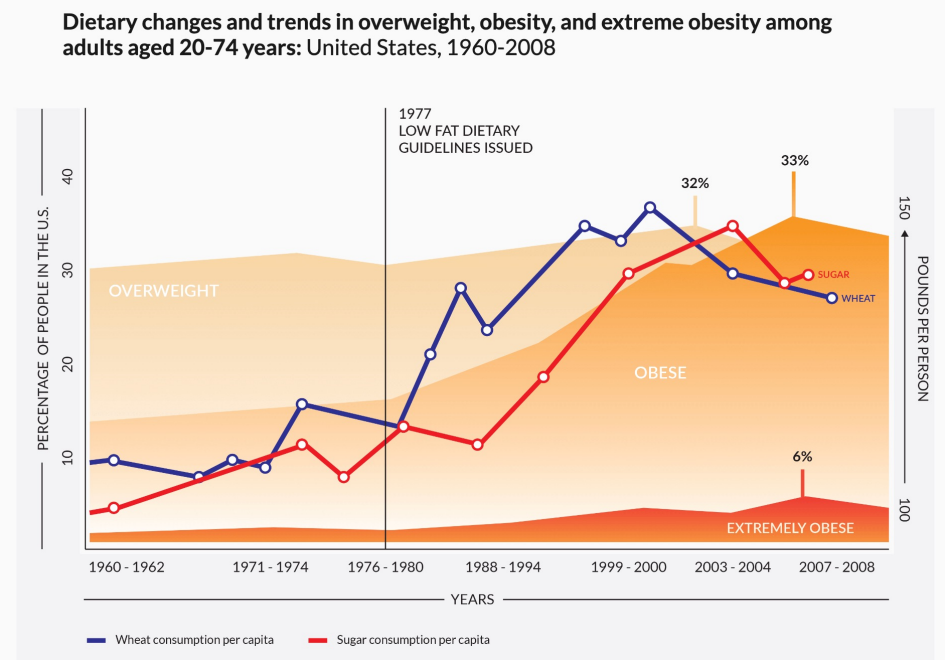
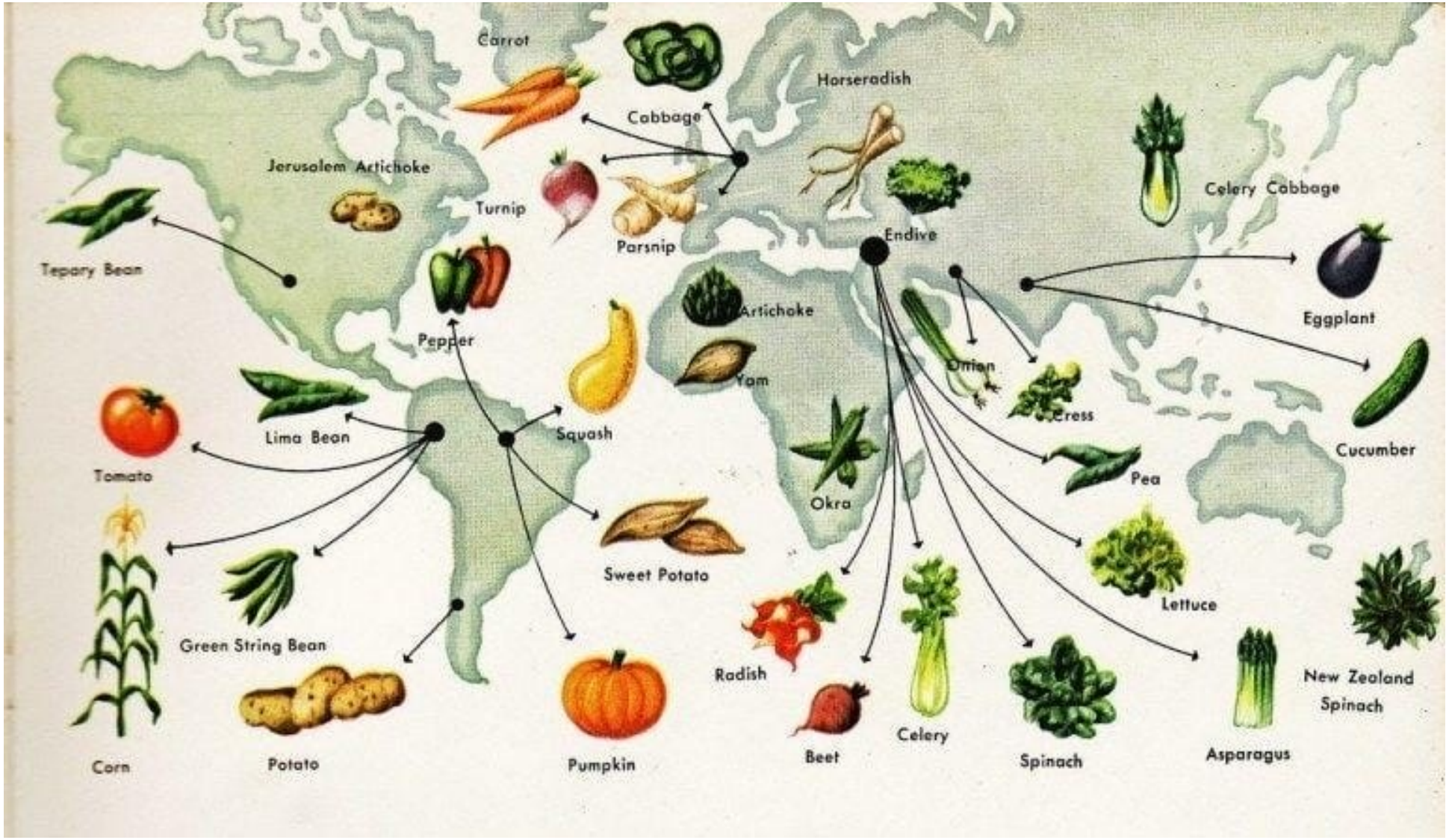
NCD are overburdening healthcare systems.





How did we get here?

Globalization of carbohydrates/glucose over the last 450 years

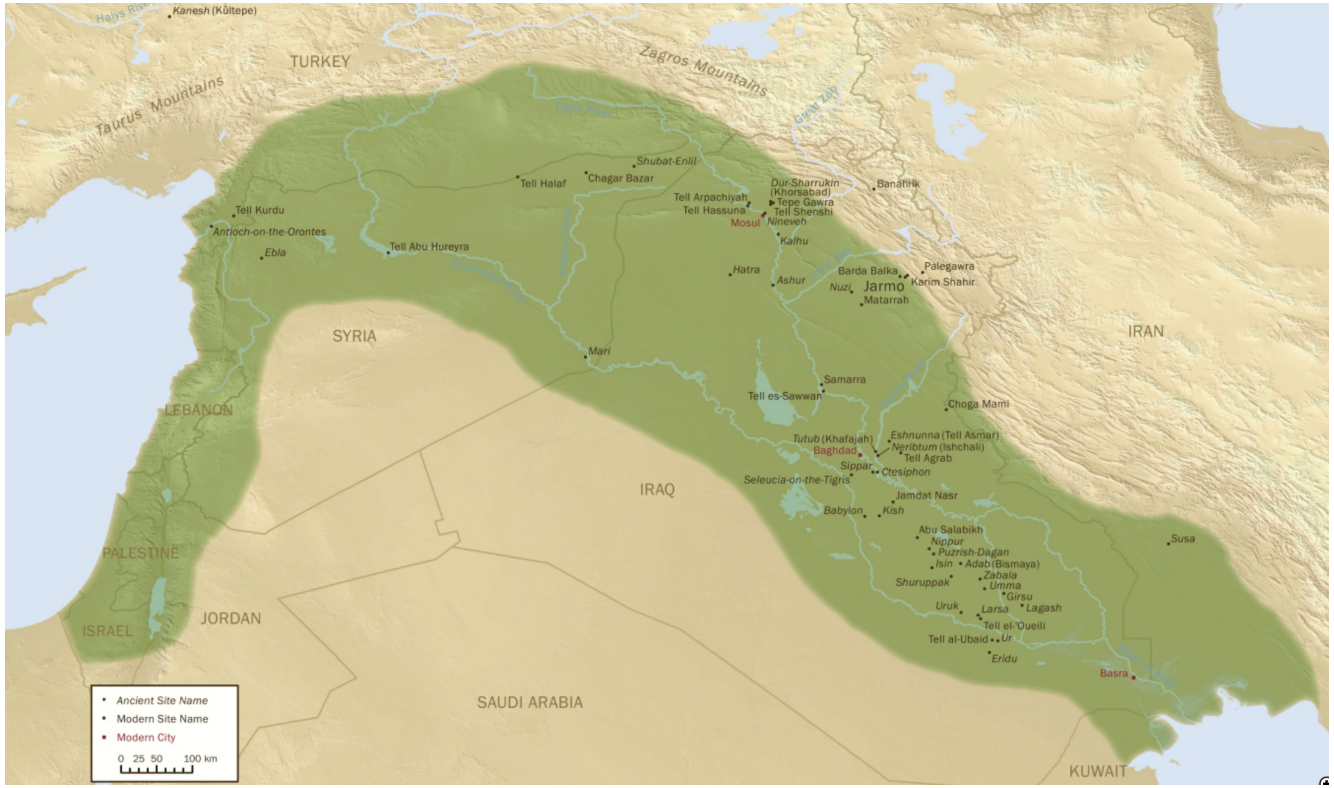


Few people know that pine and cedar forests once carpeted wide sections of the region, and that the area teemed with large wildlife. It is little known that in the Lebanese port city of Sidon, for example, hippos and lions once thrived in green areas

We ate the animals and cut down the trees creating the first ecological disaster

Cereal became subsistence farming, Cereals allowed armies to march and land to be conquered

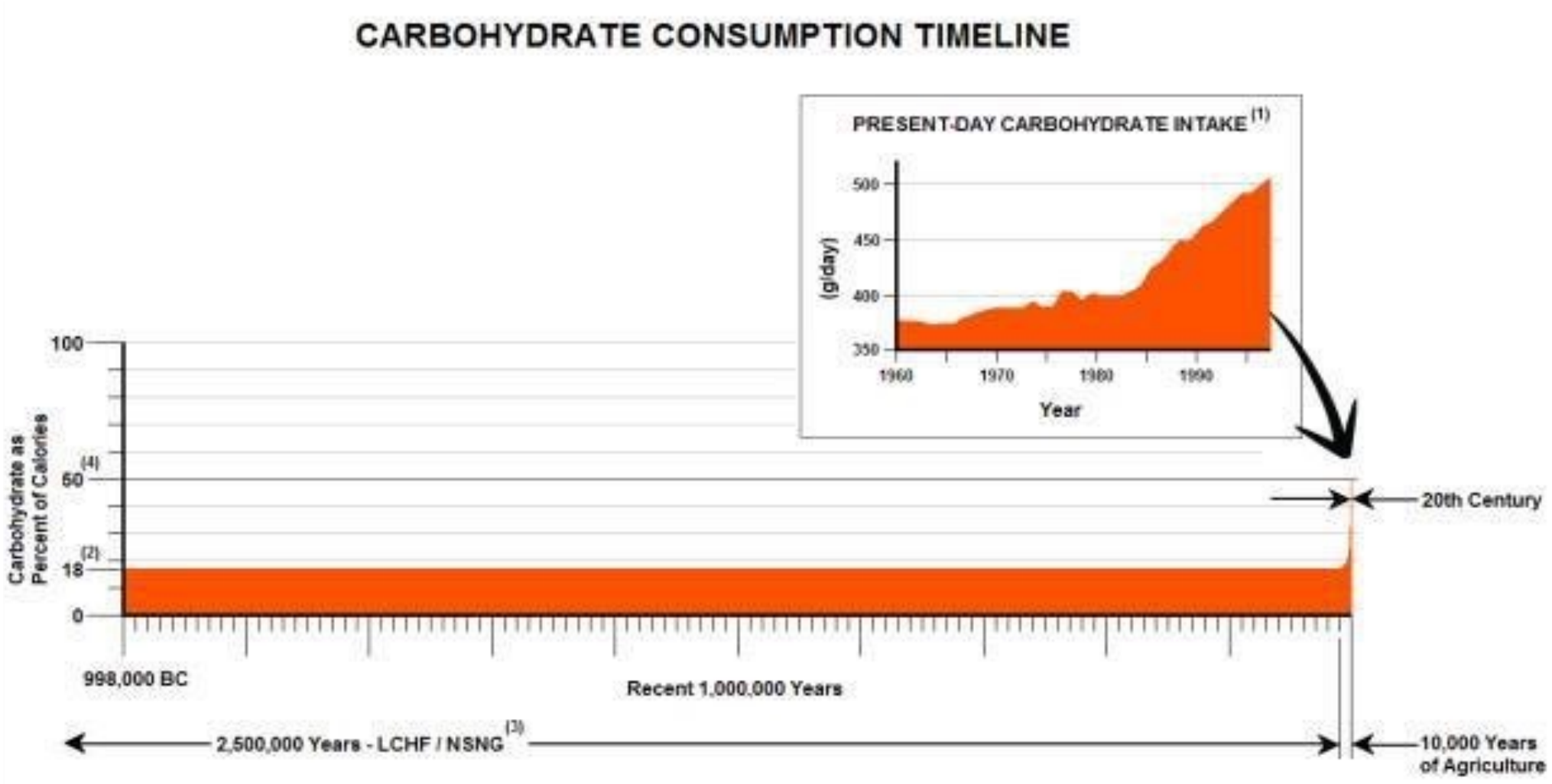
But is it the optimal food substrate for us as humans?



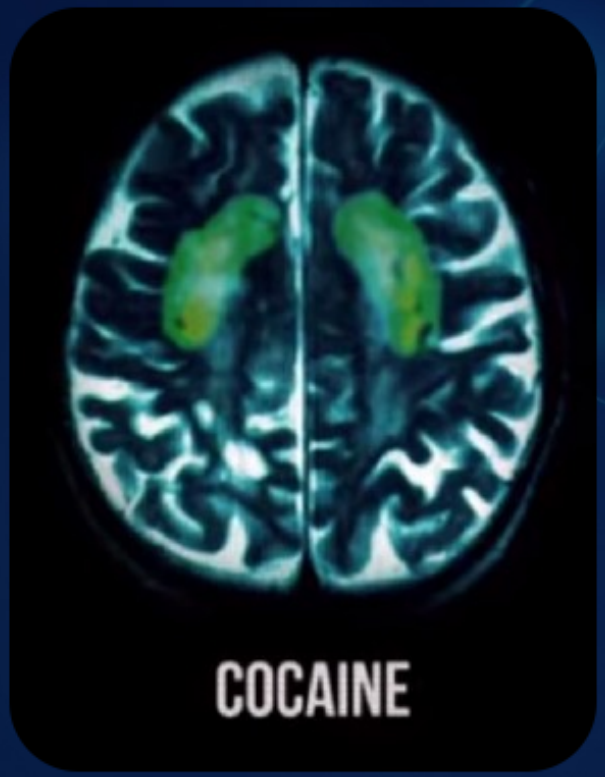
The first known mention of diabetes symptoms was 1552 B.C. by Egyptian physician Hesy-Ra

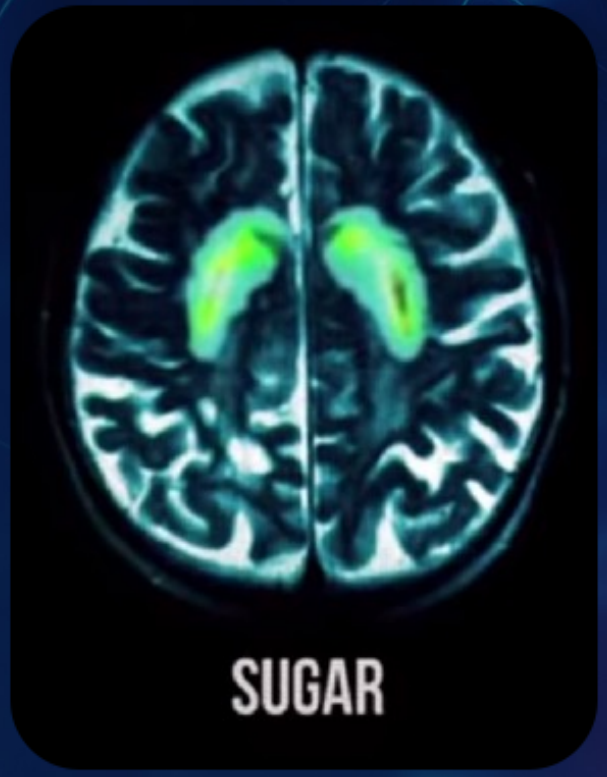
How did we get here?

Historical timeline from Ketosis to Glucosis



And how does sugar affect the brain?





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Second half of pregnancy ketones supply as much as 30% of the energy required by the fetal brain, implying that ketones are essential for fetal brain development.

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International Journal of Diabetes
IJD, 5(1): 157-163
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ISSN: 2644-3031

Original Research Article: Open Access

Ketone Bodies in the Fetus and Newborn During Gestational Diabetes and Normal Delivery

Tetsuo Muneta[1], Miho Hayashi[2], Yasushi Nagai[3], Momoyo Matsumoto[3], Hiroshi Bando[4], Koji Ebe[5], Hiroko Watanabe[6] and Shaw Watanabe[7*]

[1]Muneta Maternity Clinic, Chiba, Japan

[2]Japan Low Carbohydrate Diet Promotion Association JLCDPA, Kyoto, Japan

[3]Nagai Mothers Hospital, Misato, Saitama, Japan

[4]Tokushima University / Medical Research, Tokushima, Japan

[5]Takao Hospital, Kyoto, Japan

[6]Osaka University Graduate School of Medicine, Osaka, Japan

*[*7]Tokyo University of Agriculture, Japan.*

Received April 25, 2022; Accepted April 29, 2022; Accepted May 02, 2022

ABSTRACT

Background: Authors successfully treated gestational diabetes by a very low carbohydrate diet without insulin and other drugs. Increased ketone bodies seemed to play an essential role in energy metabolism, and the fetus and newborn also showed hyperketosis. It is necessary to clarify how much ketone bodies were present in the placenta and umbilical cord in the fetus and newborn and the pregnant mother with or without gestational diabetes.

Subjects and Methods: All cases were patients of Muneta OB/GYN Clinic in Chiba, where about 700 deliveries were done every year, 90% normal and 10% gestational diabetic. Blood of 313 mothers and babies at health check-up postpartum, 192 samples of placenta and cord blood at the delivery, and 122 cases were obtained at the time of miscarriage. Abbott's kit measured βHB, and 101 samples obtained at the post partem health check-up were biochemically analyzed for both βHB and glucose. The IBM-SPSS did the statistical analysis.

Results: βHB in Mothers' and newborns' blood at four days postpartum was 0.062 and 0.244 mmole/L (median), respectively, and glucose was 4.55±0.81 mmole/L. βHB was high throughout the pregnancy; In the placenta, βHB in the first-, second-and-third trimester was 1.95±0.9 mmole/L, 2.82±0.49 mmole/L, 1.87±0,65 mM/L, respectively. In the cord blood, it was 2.3±1.13 mmole/L, 1.36±0.76 mmole/L, and 0.69±0.6 mmole/L, respectively. Placental βHB at the delivery was 1.99±0.78 mmole/L, and that of the umbilical cord was 0.75±0.36 mmole/L. In the first trimester miscarriage, βHB in spontaneous abortion was 1.84±0.85 mmole/L, while it was 2.09±0.94 mmole/L in artificial abortion. Aborted cases in the second trimester showed 1.96±0.38 mmole/L βHB and 3.74±0.75 mmole/L glucose in the cerebrospinal fluid.

Discussion: Our data showed βHB and glucose concentration in the human fetus and newborn under the normal physiological condition. βHB was present in the placenta and umbilical cord blood throughout fetal life and after birth. Different concentrations between the placenta and umbilical cord blood suggested the fetus's uptake for energy and intrauterine growth. High βHB in the cerebrospinal fluid suggested the effects on neuronal development.

Keywords: 3-hydroxybutyric acid, Ketone bodies fetus, Placenta, Umbilical cord, Cerebrospinal fluid, Miscarriage, Gestational diabetes

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Babies have high metabolic flexibility and switch to a state of nutritional ketosis quickly, an ability that we slowly lose with age.

DOI: 10.1146/annurev.nutr.26.061505.111258

Annu. Rev. Nutr. 2006. 26:1–22
doi: 10.1146/annurev.nutr.26.061505.111258

First published online as a Review in Advance on May 9, 2006

FUEL METABOLISM IN STARVATION

George F. Cahill, Jr.*
Department of Medicine, Harvard Medical School, Boston, Massachusetts 02115; email: gcahill1@cheshire.net

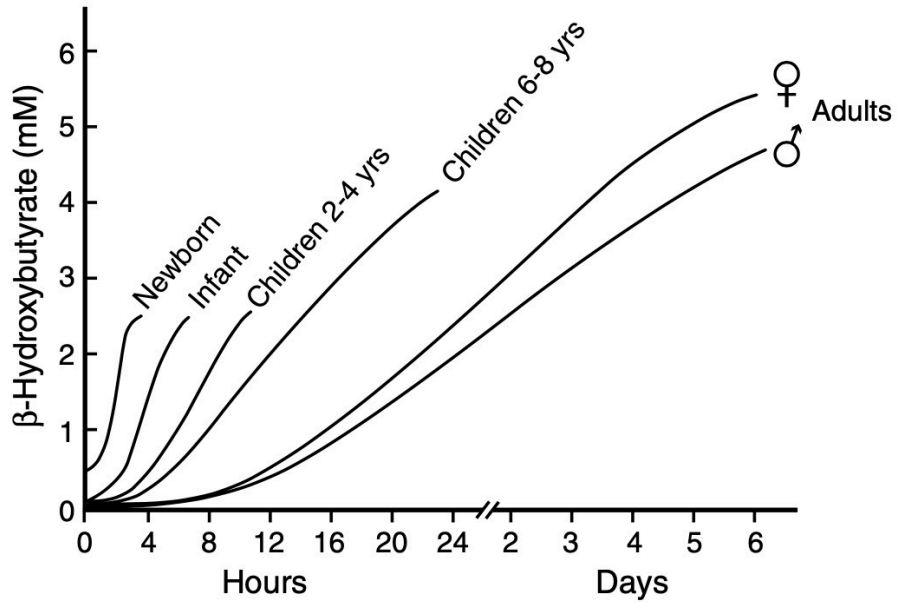
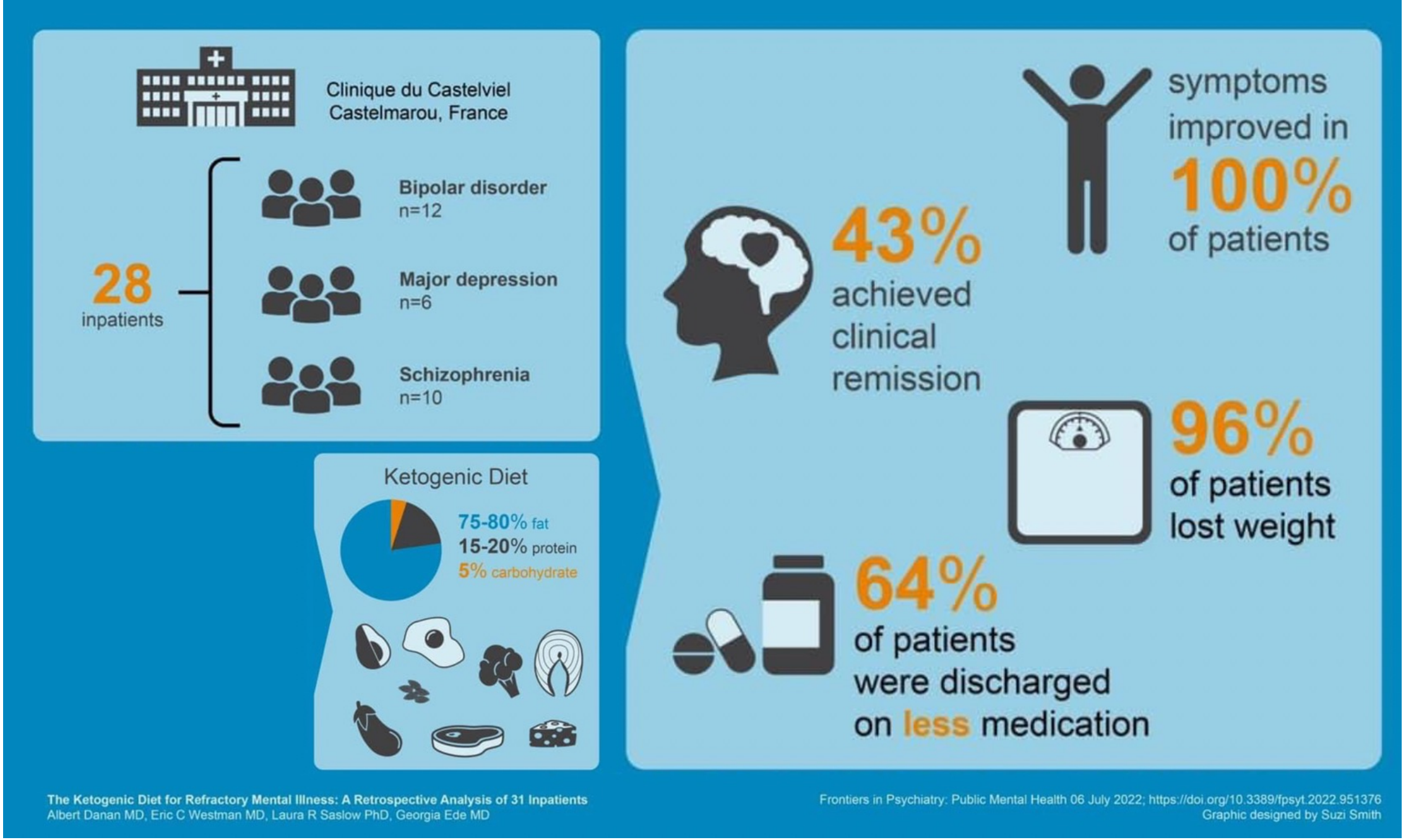


Figure 6 Levels of β-hydroxybutyrate in starving subjects of different ages (5, 13, 30, 54, 59, 66). Not shown is the accelerated ketosis in fasting pregnant or lactating women or in any subject with marked renal glucosuria requiring increased gluconeogenesis, e.g., when the renal threshold is surpassed, as in type 1 diabetes (40), or with genetic renal glucosuria or chemical inhibition of tubular reabsorption of glucose (phlorizin administration).

What can Ketosis do for mental health?



DOI: 10.3389/fpsyt.2022.951376

The Glucose-Ketone Index

Cerebral glucose hypometabolism and insulin resistance are common in neurological diseases like Alzheimer's, Parkinson's, and epilepsy.

DOI: 10.1097/MED.0000000000000564

Current Opinion in Endocrinology, Diabetes and Obesity

OBESITY AND NUTRITION: EDITED BY ERIC C. WESTMAN

Ketogenic diet as a metabolic treatment for mental illness

Norwitz, Nicholas G.[a]; Sethi, Shebani[b]; Palmer, Christopher M.[c]

Author Information

Current Opinion in Endocrinology & Diabetes and Obesity 27(5):p 269-274, October 2020. | *DOI:* 10.1097/MED.0000000000000564

Purpose of review

Ketogenic diets, which have been used to treat drug-refractory paediatric epilepsy for over 100 years, are becoming increasingly popular for the treatment of other neurological conditions, including mental illnesses. We aim to explain how ketogenic diets can improve mental illness biopathology and review the recent clinical literature.

Recent findings

Psychiatric conditions, such as schizophrenia, depression, bipolar disorder and binge eating disorder, are neurometabolic diseases that share several common mechanistic biopathologies. These include glucose hypometabolism, neurotransmitter imbalances, oxidative stress and inflammation. There is strong evidence that ketogenic diets can address these four fundamental diseases, and now complementary clinical evidence that ketogenic diets can improve the patients' symptoms.

Summary

It is important that researchers and clinicians are made aware of the trajectory of the evidence for the implementation of ketogenic diets in mental illnesses, as such a metabolic intervention provides not only a novel form of symptomatic treatment, but one that may be able to directly address the underlying disease mechanisms and, in so doing, also treat burdensome comorbidities (see Video, Supplementary Digital Content 1, http://links.lww.com/COE/A16, which summarizes the contents of this review).

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DOI: 10.1186/s12986-015-0009-2

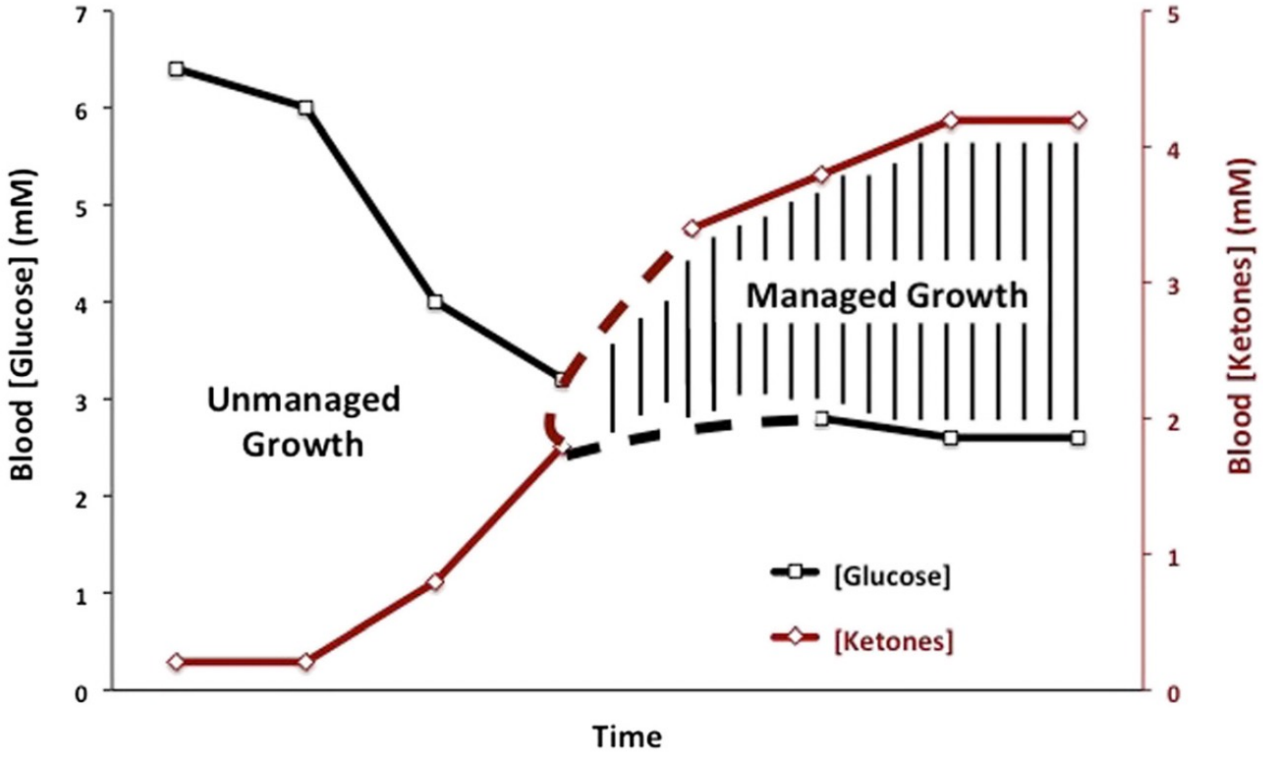
Meidenbauer *et al. Nutrition & Metabolism* (2015) 12:12
DOI 10.1186/s12986-015-0009-2

Nutrition&Metabolism

METHODOLOGY Open Access

The glucose ketone index calculator: a simple tool to monitor therapeutic efficacy for metabolic management of brain cancer

Joshua J Meidenbauer, Purna Mukherjee and Thomas N Seyfried*



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The Glucose-Ketone Index

GKI: the ratio of blood glucose to beta-hydroxybutyrate (BHB).

Originated in the metabolic management of brain tumors &
It reflects the shift from glucose (a fermentable tumor fuel) to BHB (non-fermentable).

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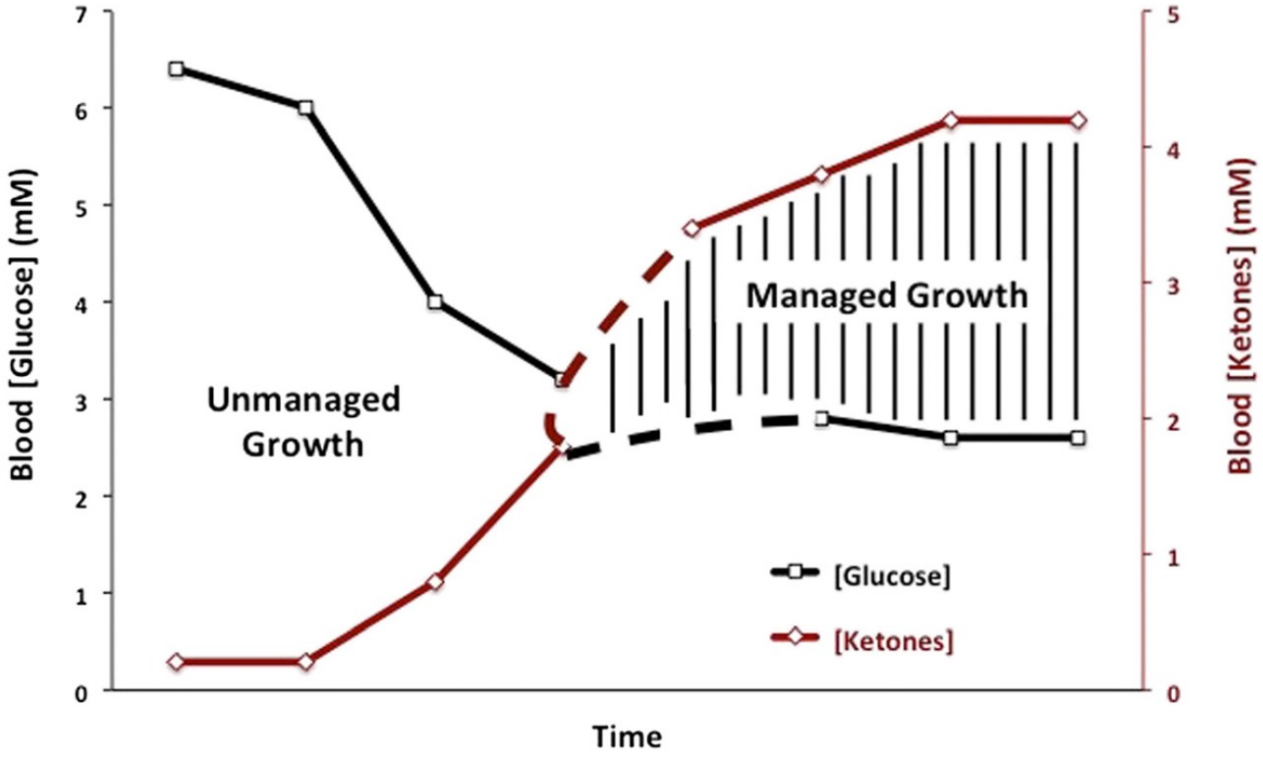

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Transition of GKI to Neurology: the GKI indicates the shift from underutilized glucose to efficiently utilized ketones.

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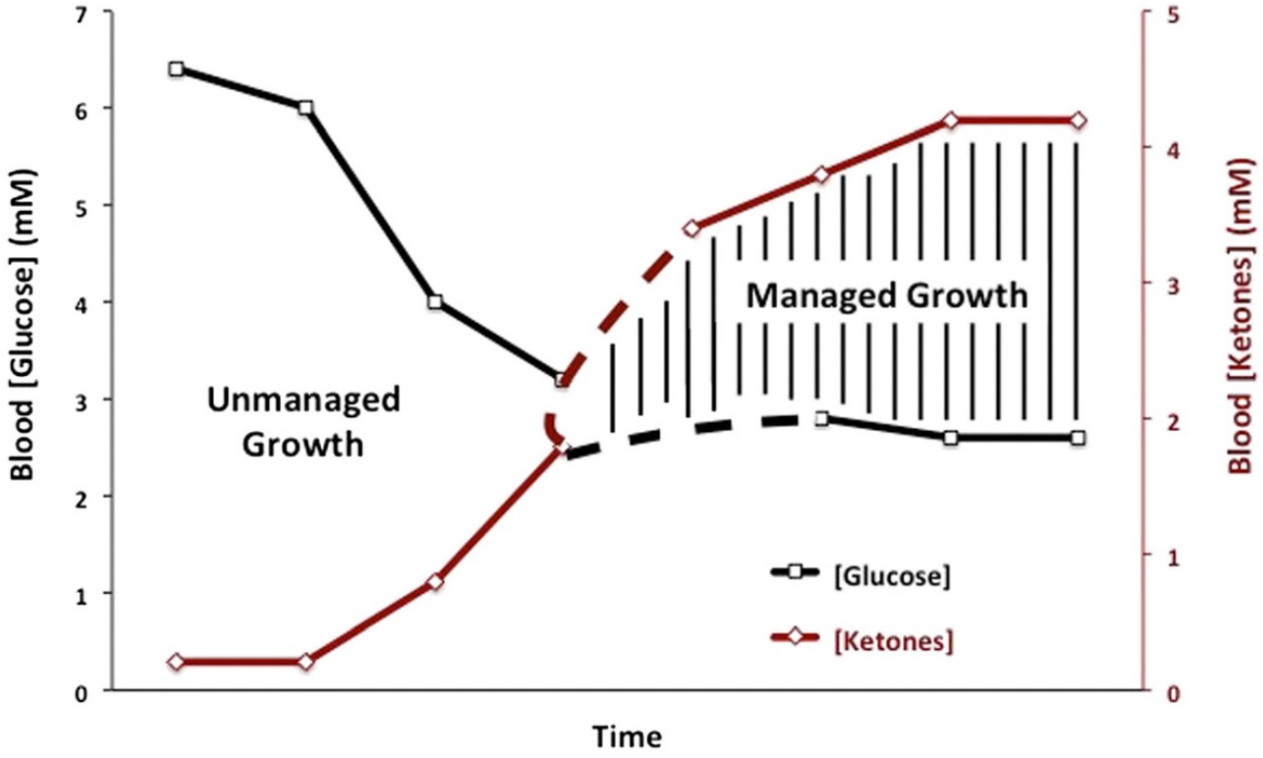

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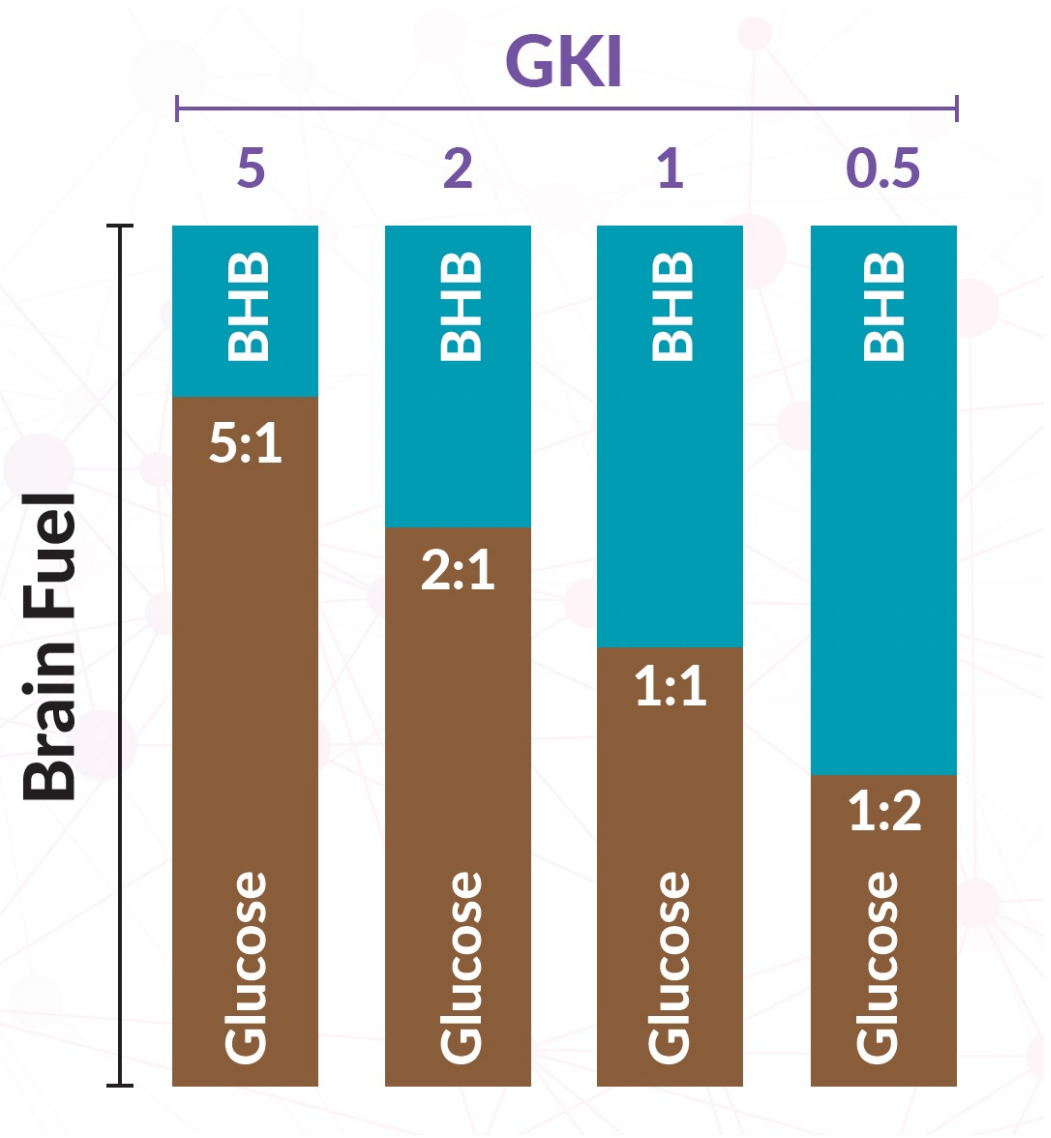
The GKI emerges as a pivotal biomarker in both cancer and neurological disease management, highlighting the potential of ketogenic metabolic therapies.



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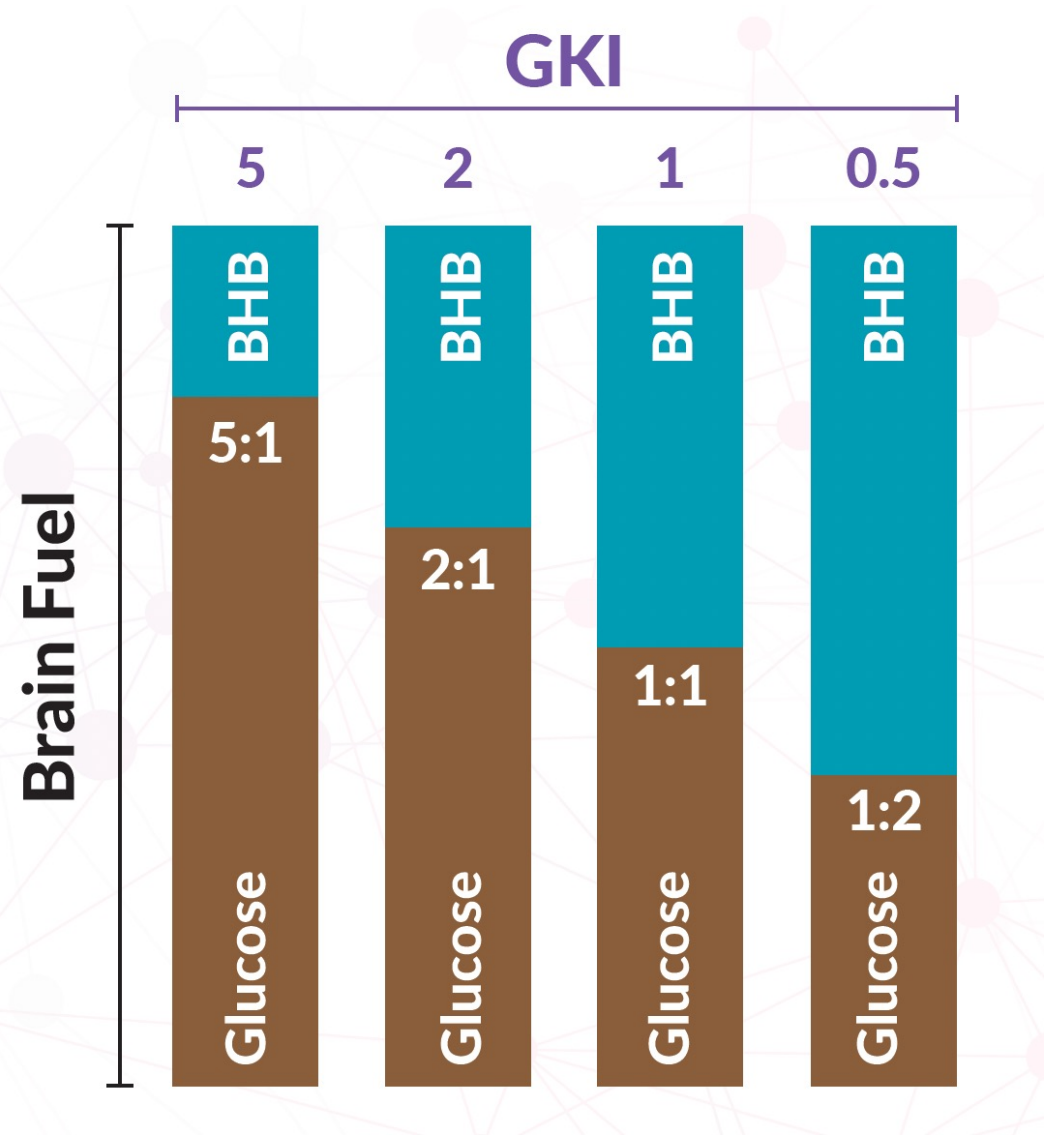
The GKI's ability to reflect metabolic states conducive to brain health and tumor management underscores its significance.



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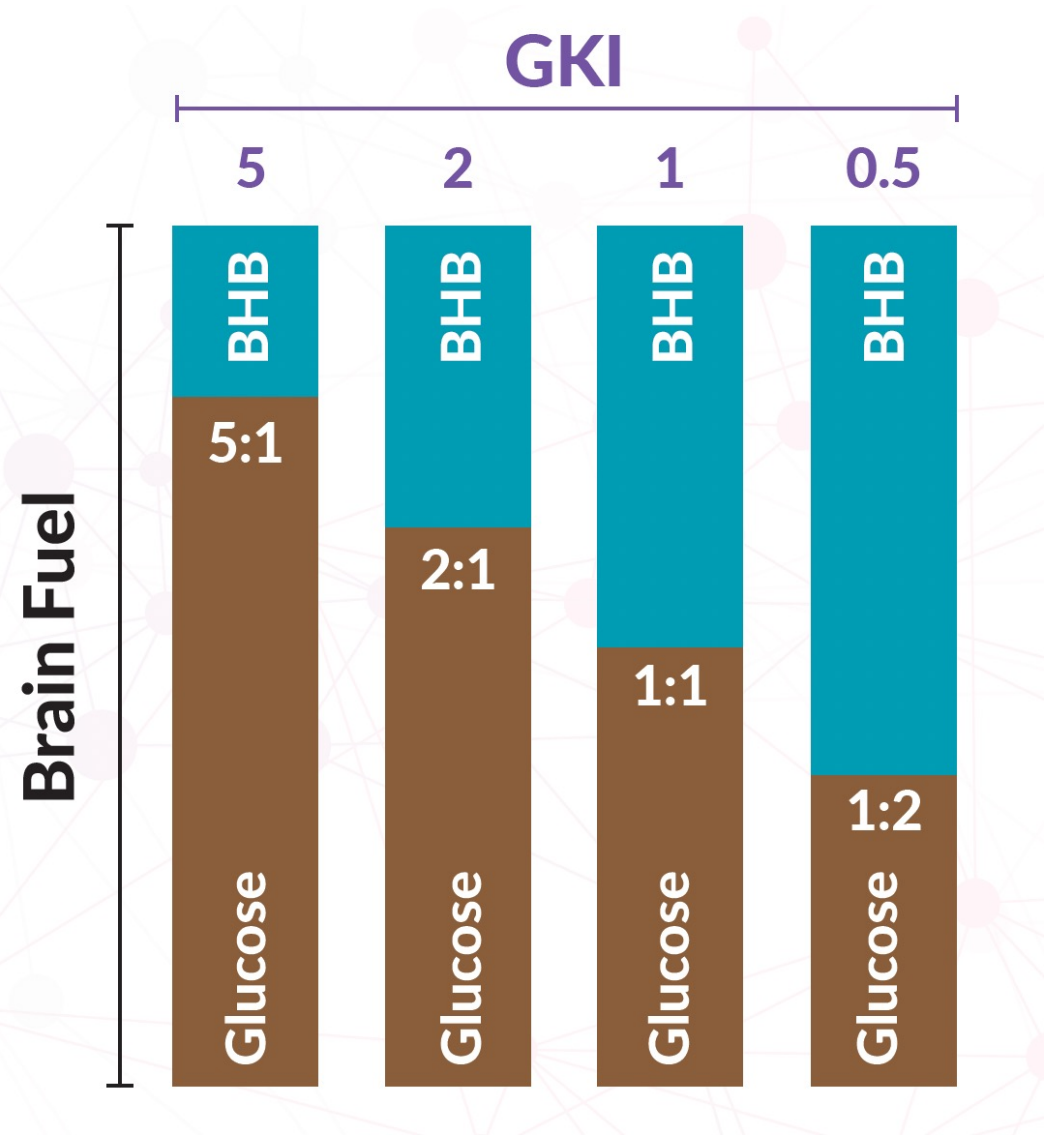
Current clinical trials are further exploring the potential of ketogenic therapies across a spectrum of neurological disorders.



Benefits of ketosis

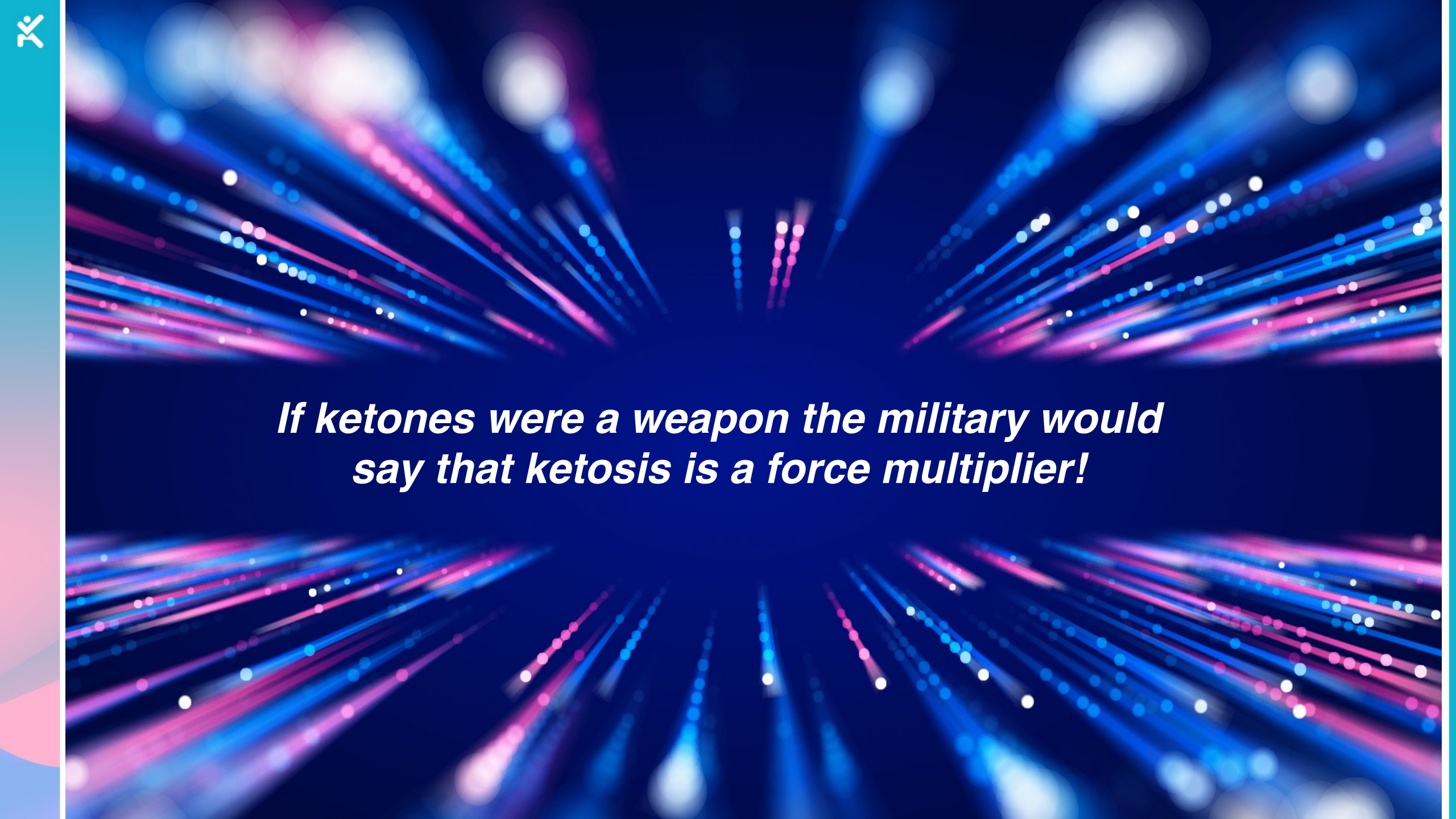
- Fat Weight loss
- Brain (Heart) run at least 25% more efficiently on ketones
- Beneficial effects for cognitive function
- Improved endurance – stamina
- Reduced inflammation
- Decreased risk of cancer, heart disease, and other non communicable disease

- Protection of telomeres and potential reduction of DNA damage
- Decrease in oxidative stress
- Increase antioxidants and scavenge free radicals
- Ketones are powerful modulators of epigenetic gene expression
- Increased ATP functions
- Increased BDNF, brain-derived neurotrophic factor

Strong evidence ketosis is beneficial for many NCD's

- Type 2 Diabetes
- Type 1 Diabetes
- Mental Health
- Metabolic Syndrome
- Cardiovascular risk
- Epilepsy
- Obesity
- Alzheimer's
- Parkinson's

- Multiple Sclerosis
- Polycystic Ovarian Syndrome
- Adjuvant for Cancer
- Polycystic Kidney Disease
- NAFLD
- Autism
- Traumatic Brain Injury
- Migraine headaches


If ketones were a weapon the military would say that ketosis is a force multiplier!

Glucosis vs Ketosis

- Ketosis is the evolutionary default nutritional status for humanity.
- Ketosis is the optimal biohack.
- Should you wait until you have a metabolic disease to try it?
- Optimization is better than cure.

What's in your tank?

Thank You

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