



Precision Nutrition at the Intersection of History & Genomics

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Both Precision Medicine & Precision Nutrition only Work when they are Precise



So what can we learn about the etiology of the unusually high rate of hypertension and kidney failure in African -Americans?

For decades, medical researchers have searched for answers to the 75% rate of hypertension in African Americans of slave descent and a mortality rate from kidney failure that is 3 times that of Whites and other demographic groups in the U.S.

Hypertensive disease also leads to cardiovascular disorders. These comorbidities have had a devastating effect on the African-American community during the COVID-19 pandemic.



LAGOS, NIGERIA

The essential problem here is that the medical community lacked a more precise knowledge of the ecological niche from which African-Americans of slave descent emanated.

Medical researchers even traveled to African countries and tested inhabitants of coastal cities like Accra, Lagos, and Banjul but they could not replicate the same high incidence of hypertension.

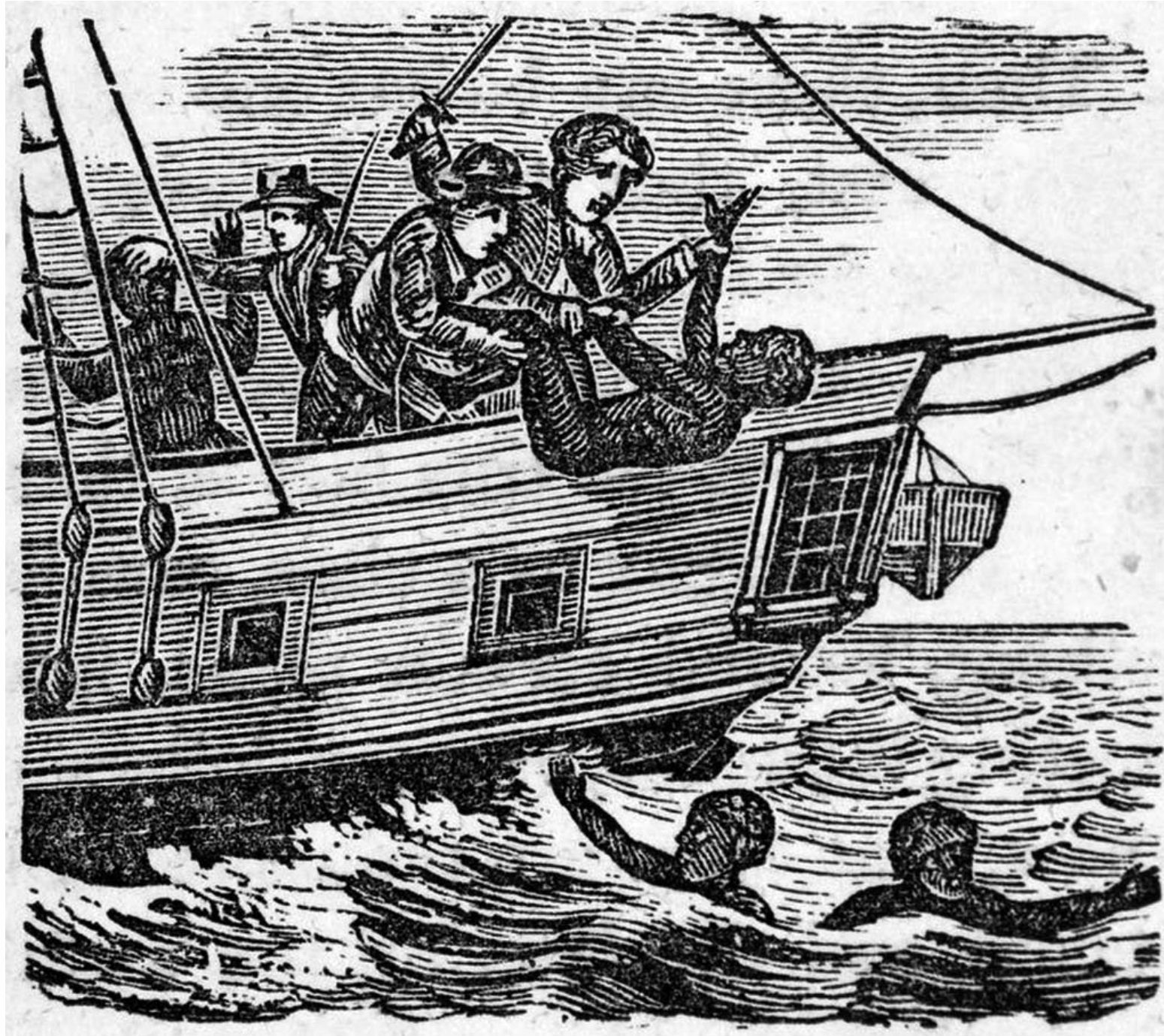
The Fallacies Related to Origins of African -Americans (of slave descent)

1. Race is not a scientific concept and it should not be used in medicine except for purposes related to addressing discrimination and past exclusion.
2. DNA Ancestry gives us a sharper focus. Understanding **ECOLOGICAL NICHE POPULATIONS** gives us even greater precision.
3. Contrary to common belief, the ancestors of Black Americans did not come from the coast of West Africa. They were merely loaded onto slave ships there, after being kidnapped and marched in chains from the deep interior of West Africa for 500 to 1000 miles.

But why does this detail even matter?

1. The reason is because coastal West Africans like Europeans were genetically accustomed to consuming 5,000 mg/sodium/day.
2. The ancestors of African -Americans lived on a dietary sodium intake of 200 mg/day. They had become genetically adapted to inhabiting one of the most sodium -deficient regions of the world.
3. And because of the tropical climate, efforts to trade sea salt this far inland failed because impurities in the product made it rancid and unsellable.

The Slave Hypothesis



This was a popular theory several decades ago. It posited that since sick slaves were thrown overboard the slave ships, the survivors were theorized to function on lower sodium levels.

This theory made sense, because sick slaves were indeed thrown overboard. But it is not the cause for salt-sensitive hypertension in African-Americans.

SOCIAL DETERMINANTS OF HEALTH DISPARITIES

AND HOW DO I KNOW?

institutionalized racism

As an African evolutionary historian, methodological tools that I have used in this case study are ancient manuscripts from Timbuktu, oral traditions, and anthropological evidence.



So precious was salt in these societies, that their elites traded their gold for it.

However, these subsistence farmers at the lowest echelons of the society had never even tasted table salt.

Their diet was nevertheless high in potassium, which came from the burnt ashes of millet leaves and other plants.

However, beginning in the 17th century, an enormously profitable market for skilled farmers developed in the New World.

It was the peasant farmers not the elites from these decentralized societies who became vulnerable to being kidnapped by slave traders.



So Now Let Me Clarify the Concept of AN ECOLOGICAL NICHE POPULATION



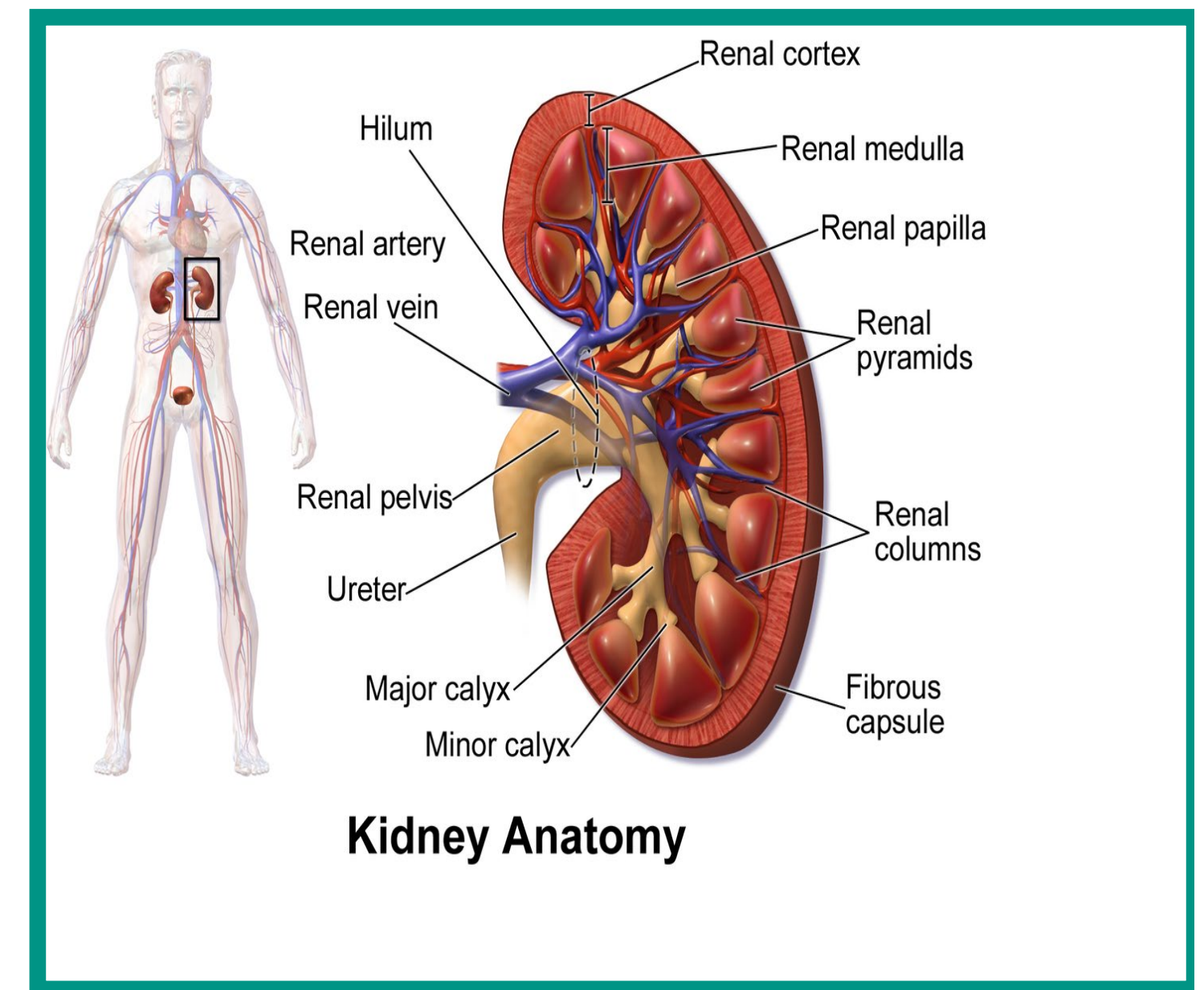
African-Americans of slave descent are not a race, but come from an ecological niche that is sufficiently unique, that their ancestors had to evolve certain genotypes that made it possible to survive in this harsh environment.

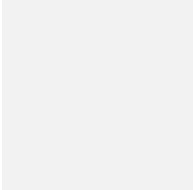
THE APOL1 GENE VARIANTS

The G1 and G2 APOL1 gene variants, are found almost exclusively in people of the West African interior.

Medical researchers have recently found that these variants are associated with a two-to-100-fold increased risk of kidney disease development.*

*<https://www.niddk.nih.gov/news/archive/2017/story-variants-unraveling-genetic-basis-elevated-risk-kidney-disease-african-americans>





So What Health Clues Do We Find at the Intersection of African -American History & Genomics?

1. African -Americans of slave descent consume (3,400/200) or 1700% more sodium than their ancestors, adapted to the low -sodium interior of West Africa
2. Americans of European -ancestry generally consume (3400/5000) 32% less sodium than their ancestors, British, Scandinavians and other coastal populations.

WHO BENEFITS MOST AND WHO BENEFITS LEAST
FROM AN AMERICAN AVERAGE SODIUM INTAKE OF
3,400 MG/DAY?

5,000 mg/day and 200 mg/day cannot be averaged if
our goal is to improve the health of these two diverse
genetic populations.

Rather, they will need to be stratified not by race, but
by DNA ancestry.

An Ancestral Gene Variants Theoretical Model



•
.75 DNA
Niger-Kordofanian West African
200 mg/day

+



.25 DNA
Northern European
5000 mg/day

=



1.00 DNA
African-American
?

$$(200 \times .75) + (5000 \times .25) = 1250 \text{ mg/sodium/day}$$

Calculating an average daily sodium intake for admixed African-Americans of
slave descent

*Multiply % of genetic ancestry by
daily sodium consumption levels
for renal -healthy members of the population group. .*

The Hilliard -Wang Ancestral Gene Variants Theoretical Equation (for Critical Nutrient Values in ANY Ecological Niche Population)

$$C_{admixed} = \sum_{i=1}^n prop_i \times C_i$$

Suppose an admixed population with n ancestries (n = 3, 4, 5, 6) and $C_{admixed}$ is the healthy nutrient intake for each segment of admixed ancestry . We use the formula above to describe this relationship. *(The current challenge relates to a lack of available data for healthy nutrient intakes in diverse non-European populations).*



SO WHAT IS THE
BIG PICTURE
HERE?

21st century nutritional and health research
operates from an outdated paradigm.

WHAT ANTIQUATED PARADIGM??

It is the pre -Human Genome Project, pre -precision medicine and pre -precision nutrition model best described as the ONE -SIZE-FITS-ALL PARADIGM.

It has great power because it is both invisible and unexamined. Yet it underlies far too much of research related to health and nutrition in the United States.

U.S.D.A. Guidelines Provide one Nutritional Standard for all Americans

Even though a great deal of thought goes into these values, the fact of the matter is that they do not serve the health interests of 37 million Americans, who happen to be of interior West African ancestry.

I'm not saying that stratifying guidelines will be easy,
given the racial tensions that still exist within
American society.

But I am saying that the unexamined one -size-fits -all
paradigm turns out to favor people of European
ancestry.

Thus we must make
adjustments to the fact
that America Is Not Just
Multi -Ethnic or Multi -
Racial.

**IT IS ALSO MULTI-
GENOMIC**



Plan A

Nutrition Facts	
Serving Size	
Servings Per Container	
Amount Per Serving	
Calories	Calories from Fat
% Daily Value*	
Total Fat	
Saturated Fat	
Trans Fat	
Cholesterol	
Sodium	
African-American Non-Afr-American	
Total Carbohydrate	
Dietary Fiber	
Sugars	
Protein	
Vitamin	
*Percent Daily Values are based on a 2,000 calorie diet.	

high

If we wish to improve African American health, let's choose a plan, not just "A" or "B" but any plan that works!

Plan B

Education & Messaging

Most African-Americans do not know that present sodium levels are killing them. It is not because of pathologies but simply because they inherited a gift from their West African ancestors of highly efficient kidneys, which are harmed by what our society has until now called "normal" sodium intake.

THE OPPORTUNITY

In closing, let me say that modern genomics and the testing of DNA ancestry has given American society the opportunity to bring greater precision to the sodium needs of all Americans.

Rather than continuing to disadvantage one at the expense of the other for purposes of standardization, the nutritional research community will for the first time have the necessary scientific data to consider stratifying sodium guidelines by DNA ancestry.



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