“From Generation to the Interpretation of the Lipotoxicity Renal”

PhD Samuel Treviño Mora
Peter Arner. **Fat cell turnover in humans.** Biochemical and Biophysical Research Communications. Volume 396, Issue 1, 21 May 2010, Pages 101–104
Prevalence in Mexico of Overweight and obesity, both kids and adult people.
Body mass index (BMI) is not an ideal measure of body adiposity. However, it is associated with health risk.
When cells accumulate more FFAs than are required for anabolic or catabolic processes, excess lipid is esterified and stored as triglyceride in lipid droplets, called lipoproteins.
Síndrome Metabólico y su Impacto en la Función Renal
Quím. Samuel Treviño Mora
2014.
Time

Control

Problem

30 days

Control Problem

Time (days)

Ratio: Bowman's capsule/glomerular tuft

0.0 0.2 0.4 0.6 0.8 1.0

Glomerular H&E score

0 1 2 3 4

*
Healthy

- Endothelial cell
- Basement membrane
- Parietal cell
- Mesangial cell
- Albumin
- Glomerular capillary
- Podocyte
  - Podocyte foot process

DKD

- Arteriole hyalinosis
- Basement membrane thickening
- Mesangial cell hypertrophy
- Collagen deposition
- Podocyte loss, hypertrophy
- Podocyte foot process effacement
- Albuminuria
- Tubular epithelial atrophy
- Activated myofibroblast and matrix
- Influx of inflammatory cells, capillary rarefaction
The glomerular basement membrane as a barrier to albumin
Jung Hee Suh & Jeffrey H. Miner
Nature Reviews Nephrology 9, 470-477 (August 2013)
Time

Control

Problem

30 days
**M**

- **Ratio: Tubular area/Luminal area**
  - Time (days): 30, 60, 90
  - Control
  - Problem

**N**

- **Luminal area (µm²)**
  - Time (days): 30, 60, 90

**O**

- **Tubular MT score**
  - Time (days): 30, 60, 90

**P**

- **Tubular PAS score**
  - Time (days): 30, 60, 90
  - Control
  - Problem
RAGE and the pathogenesis of chronic kidney disease

Vivette D'Agati & Ann Marie Schmidt

Nature Reviews Nephrology 6, 352-360 (June 2010)
Metabolic Syndrome

Endothelial and Epithelial injury
Protein leakage

Microalbuminuria

Coronary heart disease

Chronic kidney disease
Time

Control

Problem

90 days

Graphs showing the ratio of Bowman's capsule/glomerular tuft and glomerular H&E score over time. The graphs indicate a significant increase in the ratio and score for the Problem group compared to the Control group, especially at 90 days.
Pathways through which type 1 and type 2 diabetes can cause renal damage, and the effects of known and experimental therapeutics on these pathways.
Lipotoxicity: Is an ectopic triglycerides accumulation (steatosis), with cellular damage or injury in several tissues.
Lipotoxicity in renal tubule cells.
In conclusión:

Our findings demonstrate, that chronic consumption of a high carbohydrate diet promotes severe metabolic alterations with progressive seric increases on glucose, triglycerides and FFA, and their relationship with classic diabetic nephrosclerotic changes, even before the development of type 2 diabetes.

This suggests that kidney homeostasis is maintained at the expense of serious structural changes on glomeruli and tubules, while selectivity is lost on the molecular filter; collagen, AGEs and amyloid products were accumulated progressively, increasing the extracellular matrix.

Although, classically these changes are attributed to a glucose imbalance, we must not lose sight of the fact that lipid accumulation on the cortex and the renal medulla, could be the cause of cytoarchitecture changes, glomerulotubular feedback loss and GFR decline, contributing to the development of nephropathy.
Thank you for your attention!!!

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