METABOLIC SYNDROME

and how to treat it

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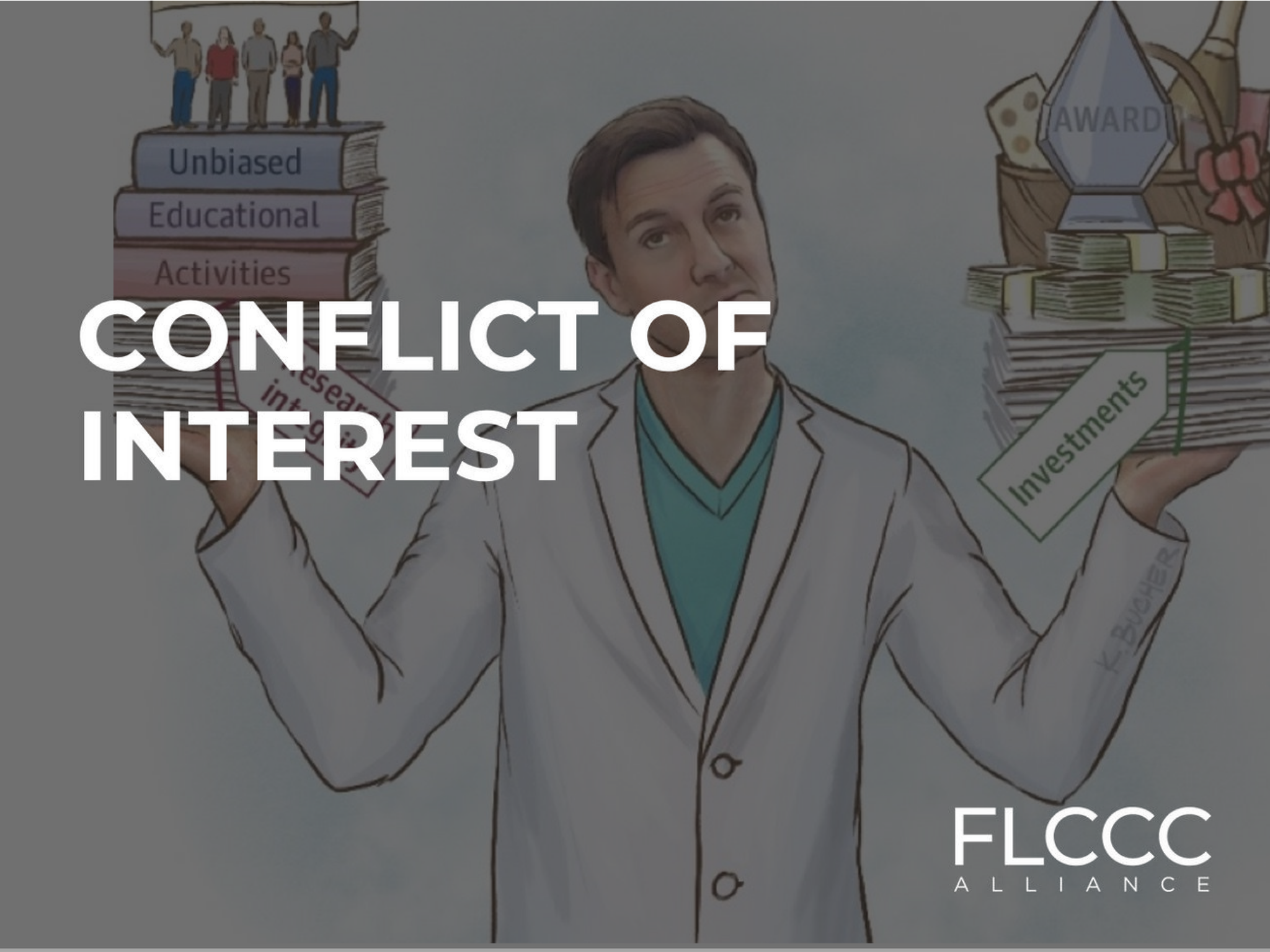
FRONT LINE COVID-19 CRITICAL CARE ALLIANCE
PREVENTION & TREATMENT PROTOCOLS FOR COVID-19



CONFLICT OF INTEREST

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The treatment of prediabetes and diabetes should always be under the supervision of a health care provider.

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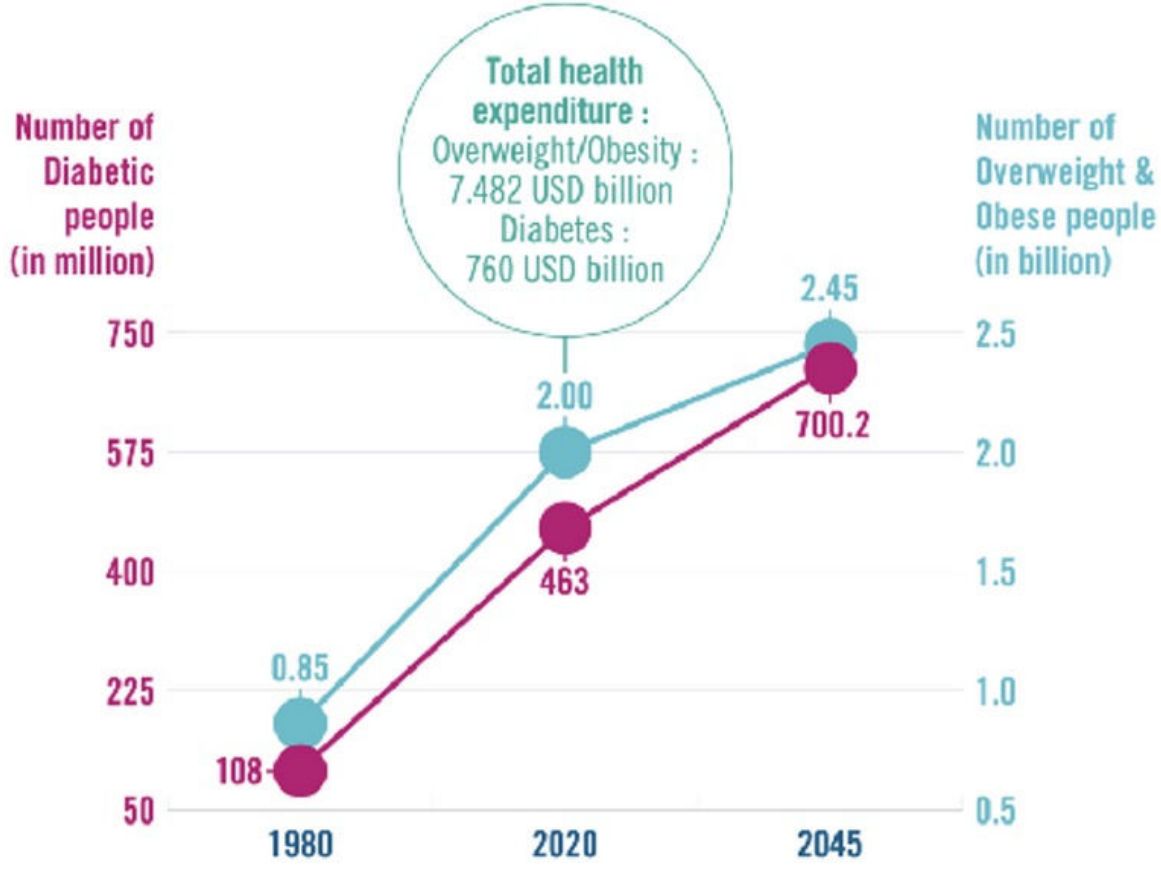
WORLDWIDE INCIDENCE OF DIABETES AND OBESITY



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WHAT IS METABOLIC SYNDROME?

A group of symptoms that raise your risk of heart disease.

Signs

- A waistline over 40 inches in men and 35 inches in women
- Blood pressure readings of 130/80 mmHg or higher
- A fasting glucose level over 100 mg/dL (5.6 mmol/L)
- A fasting triglyceride level over 150 mg/dL (1.7 mmol/L)
- A HDL cholesterol level under 40 mg/dL (1.0 mmol/L) in men and 50 mg/dL (1.3 mmol/L) in women

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TESTING FOR INSULIN RESISTANCE

Fasting plasma glucose test.

- A normal fasting plasma glucose is between 70 mg/dL (3.9 mmol/L) and 100 mg/dL (5.6 mmol/L).
- A fasting blood glucose of greater than 126 mg/dL (7 mmol/L) on two separate occasions is considered diagnostic of diabetes.

Hemoglobin A1c test (A1c).

- This blood test shows your average blood sugar level for the past 2 to 3 months
- The normal range for the hemoglobin A1c level is between 4% and 5.6%
- A1c levels between 5.7% and 6.4% is indicative of prediabetes.
- An A1c of 6.5% or is diagnostic of diabetes

A serum triglyceride > 150 mg/dl (based on a fasting lipid profile).

- A low HDL.
- A low HDL is considered less than 40 mg/dl (1.0 mmol/L) in men and less than 50 mg/dl (1.3 mmol/L) in women.

TG/HDL ratio

- The single best predictor of coronary artery disease
- Ideally, you want no more than a 2:1 ratio of triglycerides to HDL cholesterol.
- So, if your triglycerides are 100 mg/dl, your HDL cholesterol should be 50 mg/dl.

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HOW TO TREAT

- Intermittent fasting/time restricted eating
- Low carbohydrate (ketogenic) diet
- **Berberine (1000-1500 mg/day)**
- Metformin (500 -1000 mg twice daily)
- Magnesium (100-400 mg daily)
- Melatonin (2 -10 mg slow/extended release nightly)
- Resveratrol (400-500 mg daily)
- Cinnamon (1-2g/day)
- Omega-3 fatty acids (1-4 g/daily)
- Probiotics with Bifidobacterium
- Reduce stress
- Exercise

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what not to eat

donuts

chips!

sweetened yogurt

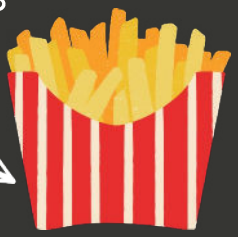
bagels, bread, pretzels, tortillas

rice and pasta

cookies, muffins, baked goods

potatoes

fries



watermelon, bananas

canned fruit and fruit juice

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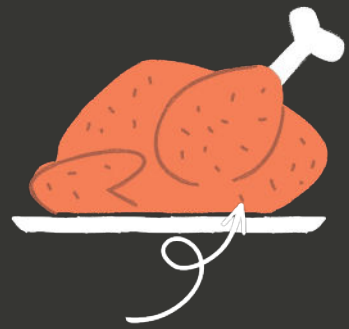
what to eat

vegetables

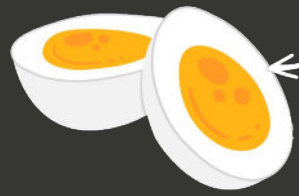
nuts

chia seeds & peanut butter

fish


chicken breast

meat


eggs

coffee (cream, no sugar)

grapefruit!

blueberries

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ABOUT BERBERINE

- Main active component of an ancient Chinese herb used to treat diabetes for thousands of years.
- Regulates glucose and lipid metabolism
- Lowers blood glucose
- Increases glucose dependent insulin release from the pancreas
- Increases hepatic fatty acid oxidation;
- Decreases hepatic steatosis
- Has potent anti-inflammatory activity
- Enhances the effects of exercise
- Modulates the microbiota

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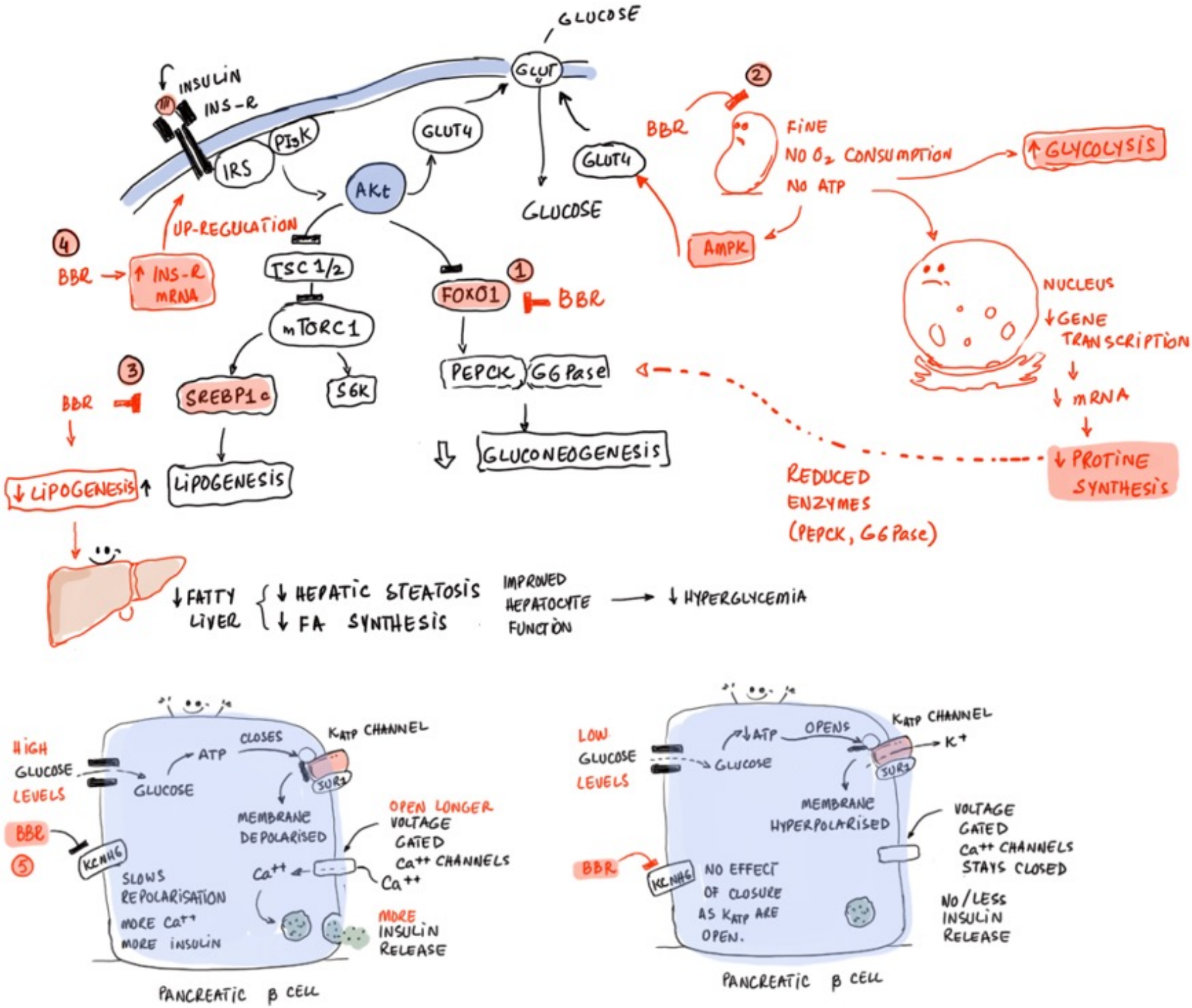
GLUCOSE
GLUT
INSULIN
INS-R
IR
PI3K
IRS
AKt
GLUT4
GLUT4
GLUCOSE
UP-REGULATION
BBR
2
FINE
NO O2 CONSUMPTION
NO ATP
↑GLYCOLYSIS
AMPK
4
BBR
↑ INS-R mRNA
TSC 1/2
mTORC1
S6K
FOXO1
1
BBR
NUCLEUS
↓GENE TRANSCRIPTION
↓ mRNA
↓PROTINE SYNTHESIS
PEPCK
G6Pase
GLUCONEOGENESIS
REDUCED ENZYMES (PEPCK, G6Pase)
3
BBR
SREBP1c
↓LIPOGENESIS
LIPOGENESIS
↓FATTY LIVER
↓HEPATIC STEATOSIS
↓FA SYNTHESIS
IMPROVED HEPATOCYTE FUNCTION
↓HYPERGLYCEMIA
HIGH GLUCOSE LEVELS
ATP
CLOSES
KATP CHANNEL
GLUCOSE
SUR1
MEMBRANE DEPOLARISED
OPEN LONGER
VOLTAGE GATED Ca++ CHANNELS
BBR
5
KCNH6
SLOWS REPOLARISATION
MORE Ca++
MORE INSULIN
Ca++
Ca++
MORE INSULIN RELEASE
PANCREATIC β CELL
LOW GLUCOSE LEVELS
↓ATP
OPENS
KATP CHANNEL
K+
GLUCOSE
SUR1
MEMBRANE HYPERPOLARISED
VOLTAGE GATED Ca++ CHANNELS STAYS CLOSED
BBR
KCNH6
NO EFFECT OF CLOSURE AS KATP ARE OPEN.
NO/LESS INSULIN RELEASE
PANCREATIC β CELL

ABOUT METFORMIN

- Has been used for over 60 years
- Most widely used drug to treat Type II diabetes
- Decreases hepatic gluconeogenesis
- Decreases glucose absorption from GUT
- Lowers fasting plasma insulin levels
- Increases insulin sensitivity
- Additional benefits of metformin may include anti-tumor effect, anti-aging effect, cardiovascular protective effect, neuro-protective effect, treatment of polycystic ovary syndrome

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ABOUT CINNAMON

- One of the major herbs in traditional Chinese medicine
- Traditional treatment of fever, common cold, inflammation, diarrhoea, and pain.
- Antifungal, anticancer, anti-inflammatory, antidiabetes, antiviral, antihypertensive, antioxidant properties
- Cardioprotective
- Glucose lowering
- May have a role in managing insulin resistance when combined with berberine

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My Blood Glucose with Berberine

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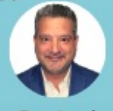
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