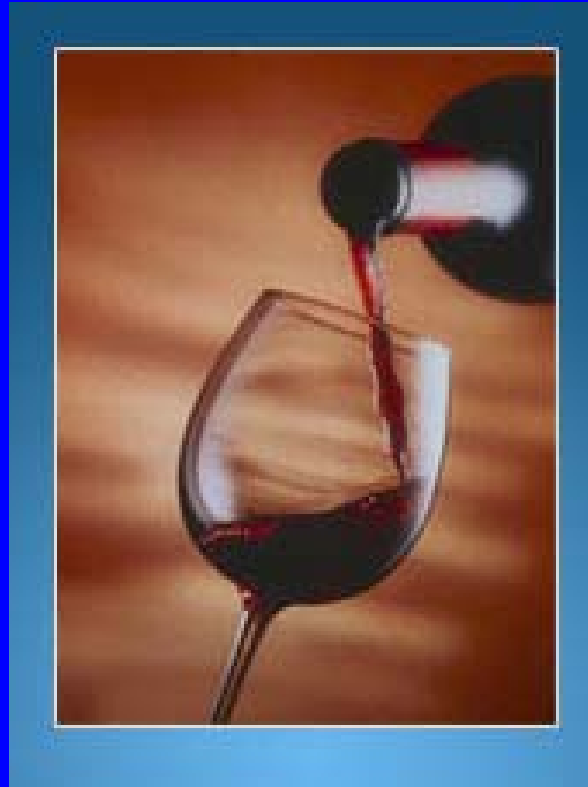


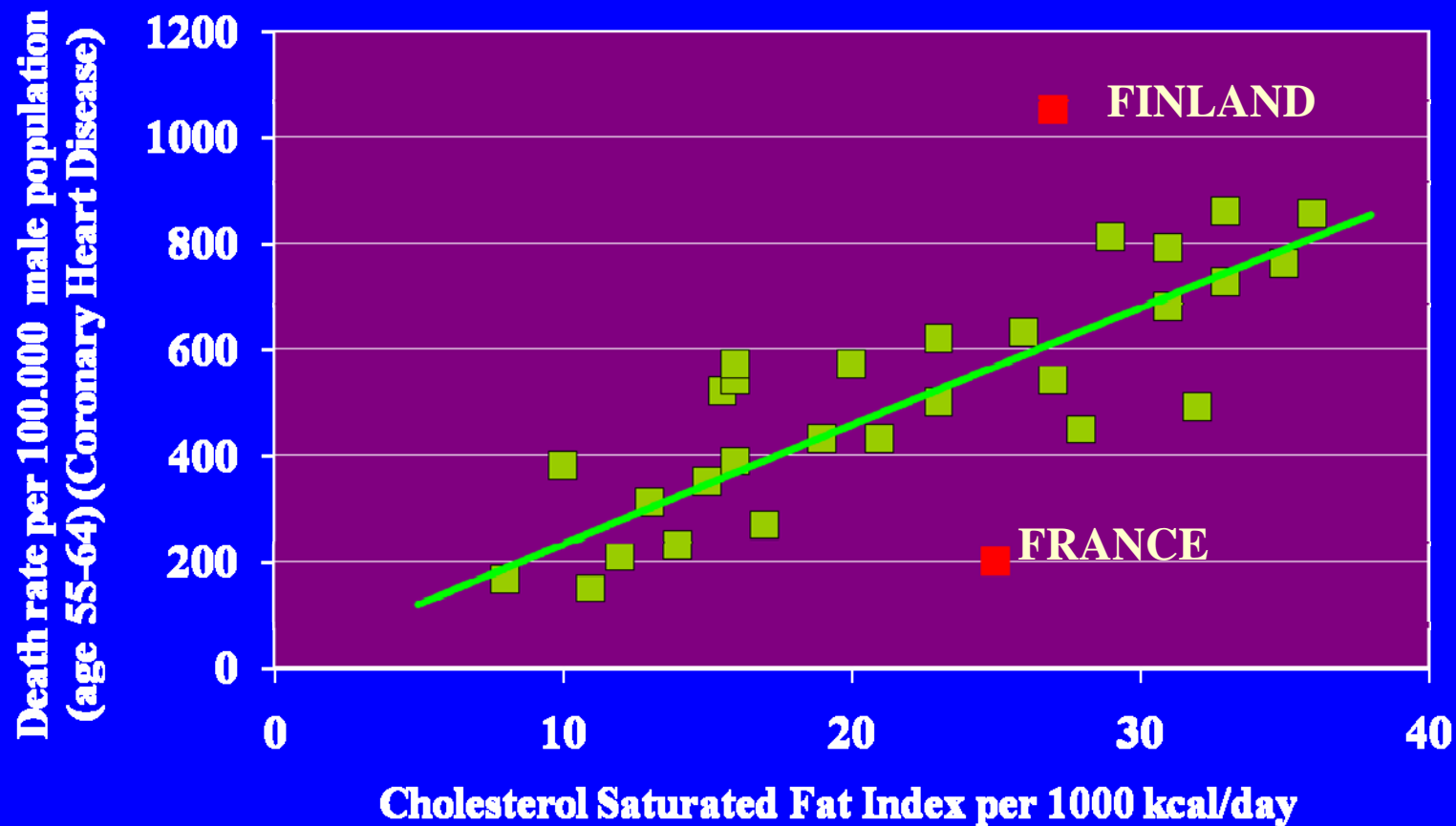
THE HEALTH BENEFITS OF WINE



BEGOÑA MUGUERZA MARQUINEZ

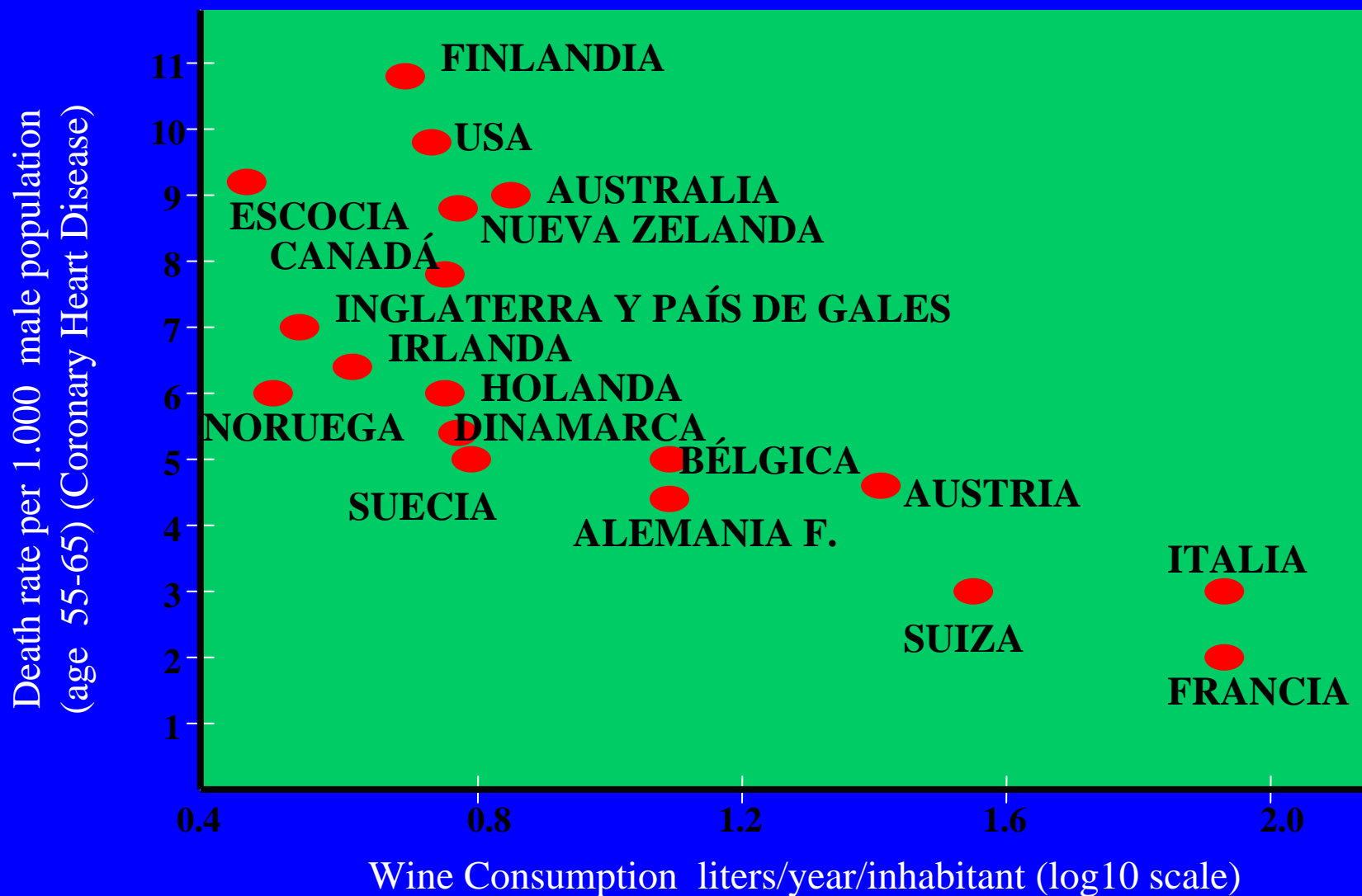
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Differences in coronary mortality can be explained by differences in cholesterol and saturated fat intakes in 40 countries but not in France and Finland. A paradox



Adapted from Artaud-Wild, Connor, Sexton y Connor. Circulation, 1993

The Relationship of wine consumption and Coronary Heart Disease



Adapted from Bourzeix, M. En: Caro G.: De l'alcoholisme au bien boire. París: L'Harmattan, 1990

STUDY “IN VIVO”

EXPERIMENTAL MODEL

- Voluntary intake
- Correct nutritional status
- Consumption moderate/excessive

Free access to:

- Water: CONTROL GROUP
- Water and red wine (**Priorato joven**): RED WINE GROUP
- Water and equivalent hidroalcoholic solution: EtOH=RED WINE GROUP
- Water and sweet wine (**Tarragona clásico**): SWEET WINE GROUP
- Water and equivalent hidroalcoholic solution: EtOH=SWEET WINE GROUP

INTAKE OF WINE, ETHANOL AND WATER



Model for voluntary wine and alcohol consumption in rats. L. Arola et al.: Physiology & Behavior, 62, 353-357, 1997

Oxidative status in rats after short- and long- term moderate wine consumption

LIVER

- ↑ *Superoxide dismutase activity*
- ↑ *Glutathione peroxidase activity*
- ↑ *Catalase activity*
- ↓ *Malondialdehyde*

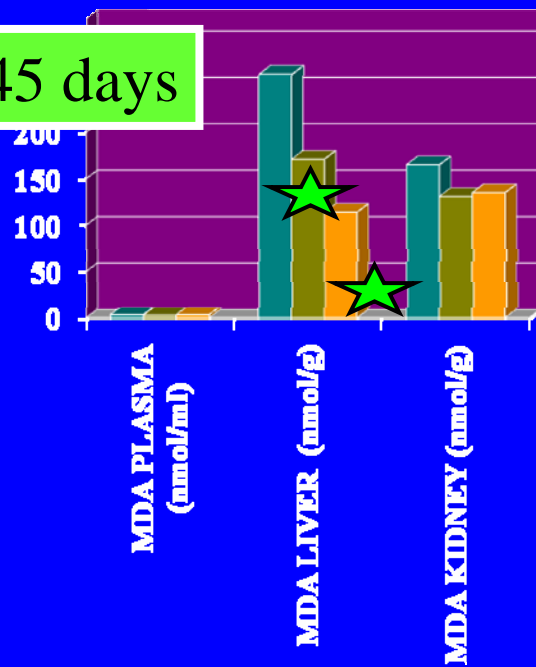
KIDNEY

- ↓ *Ratio Glutathione / Oxidized Glutathione*
- ↓ *Malondialdehyde*

PLASMA

- ↓ *Malondialdehyde*
- ↑ *Vitamin E*

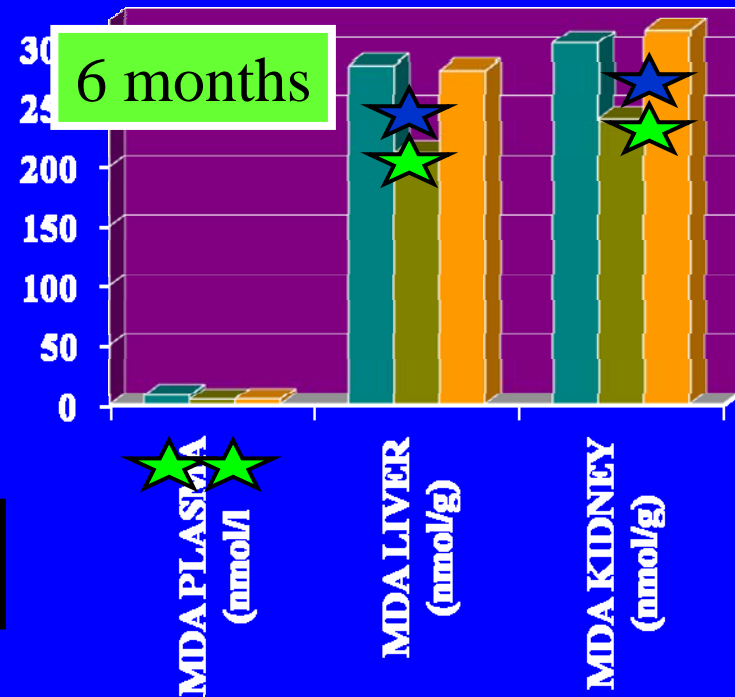
45 days



■ CONTROL
■ RED WINE
■ ETHANOL

★ vs control
★ vs ethanol

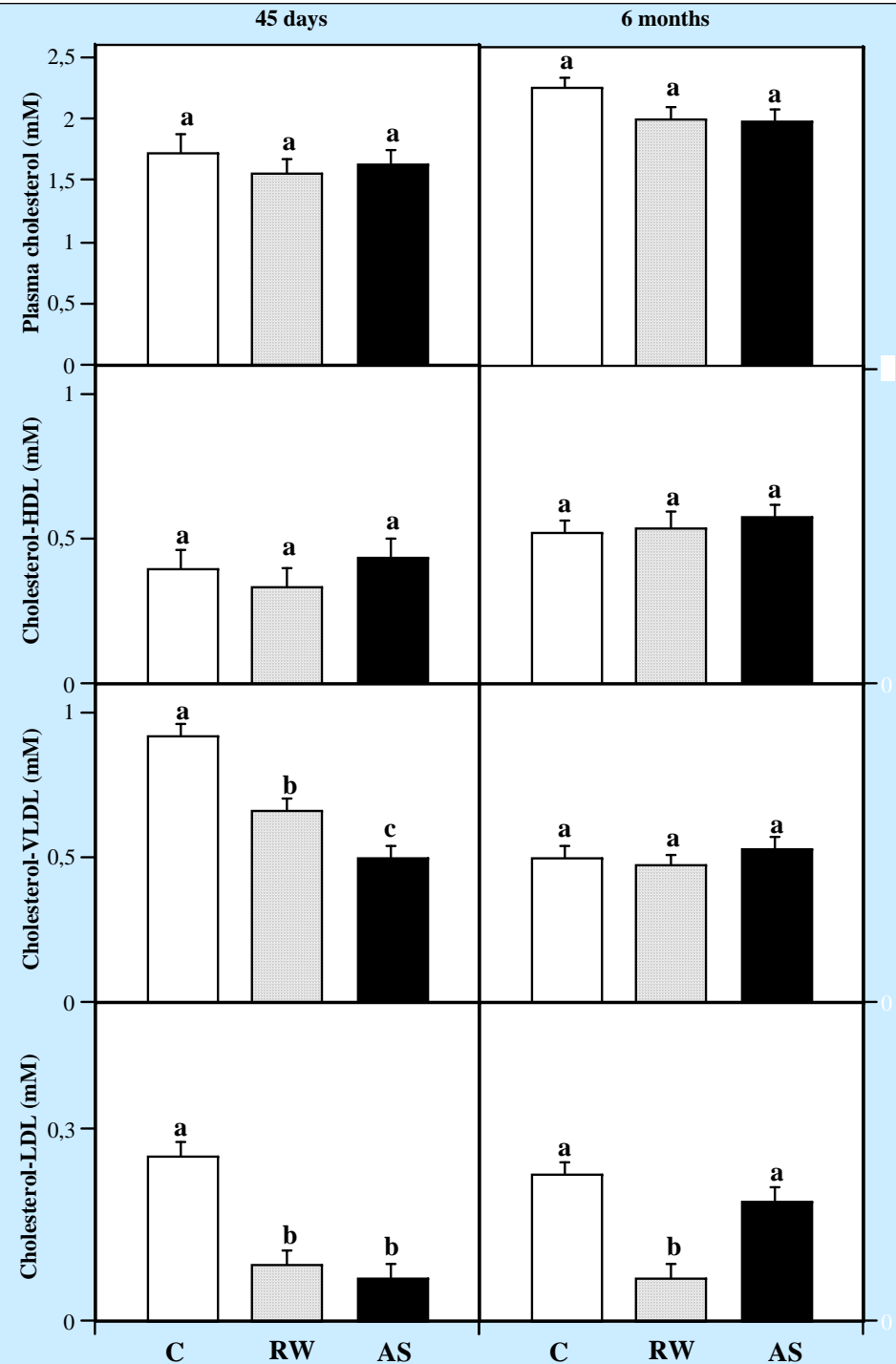
6 months



Moderate red wine consumption protects the rat against oxidation in vivo. R. Roig et al. *Life Sci.*, 64, 1517-1524, 1999

Cholesterol in rats after short- and long- term moderate wine consumption

Cascón, E., Roig, R., Ardévol, A., Salvadó, M.J., Bladé, C., Arola, L. (1999). Cholesterol and oxidation status in rats after short- and long-term moderate wine consumption. A Oenologie 99. 6e Symposium International d'Oenologies(pp. 575 - 579). ISBN: 2-7430-0352-9.



METODOLOGY

- In vitro studies

- **FAO cells + H₂O₂** (TBARS, % LDH, GSH/GSS, GR, GST, GPX Catalasa, SOD)
- **FAO cells + ACETATO-C¹⁴**
(Colesterol-C¹⁴, Ester de Colesterol-C¹⁴
Triacilgliceroles-C¹⁴)
- **3T3-L1 cells (adipocytes)**
(Glicerol, Glicerol-3P DH, mRNA LSH)
- **3T3-L1 cells + (2-deoxiglucose)**
- **L6E9 cells (myocytes) + (2-deoxiglucose)**
- **RAW 264.7 cells (macrophage)**

- In vivo studies

- Wistar rats
- Cafeteria obese rats
- Zucker rats
- Estreptozotocin-diabetic rats
- SHR rats

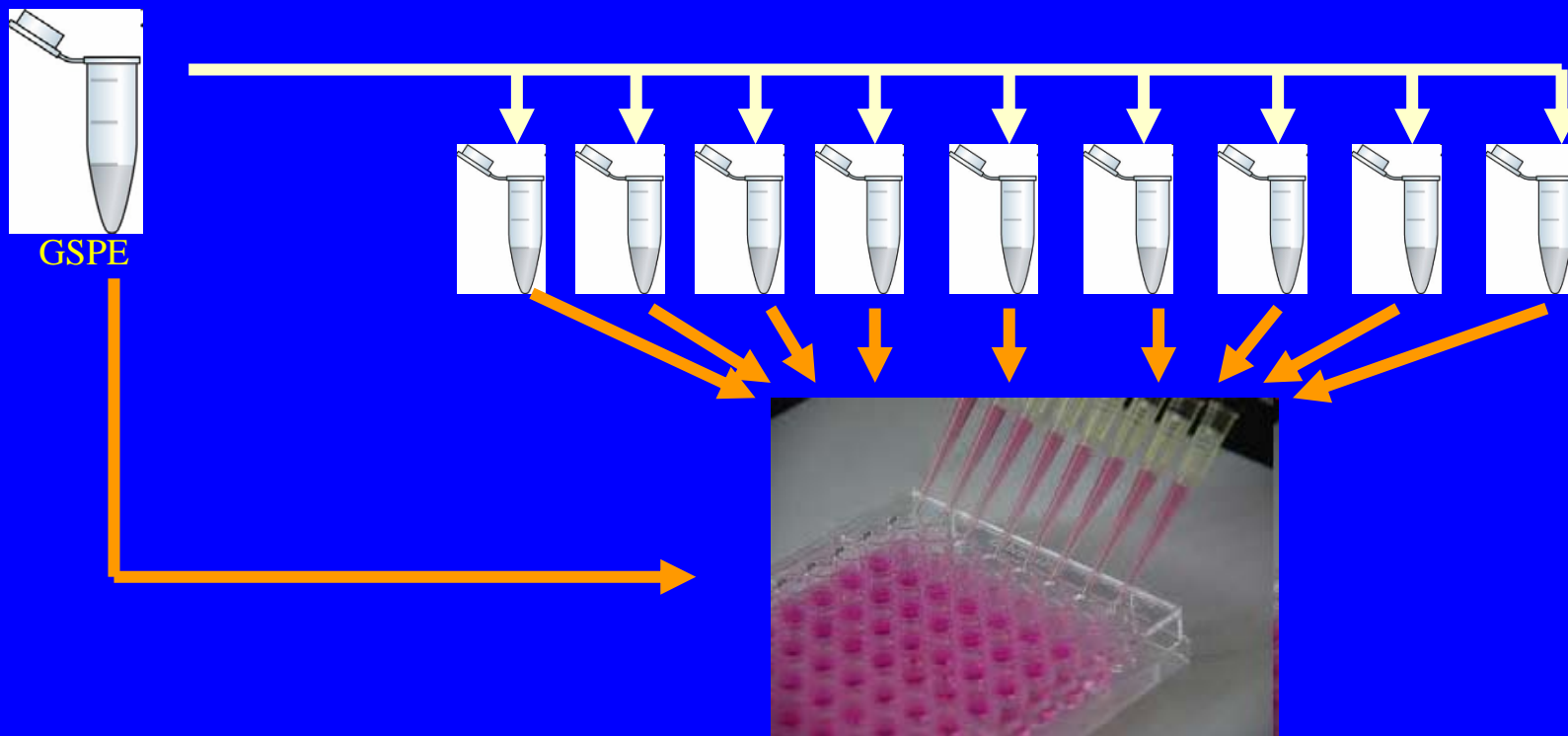
- In silico studies

Use of grape extracts

PHYSIOLOGICAL CONDITION O PATHOLOGY

- **Oxidative stress**
- **Cholesterol homeostasis**
- **Glucose homeostasis**
- **Inflammation**
- **Hypertension**
- **Genic expression**

Bioactive compounds

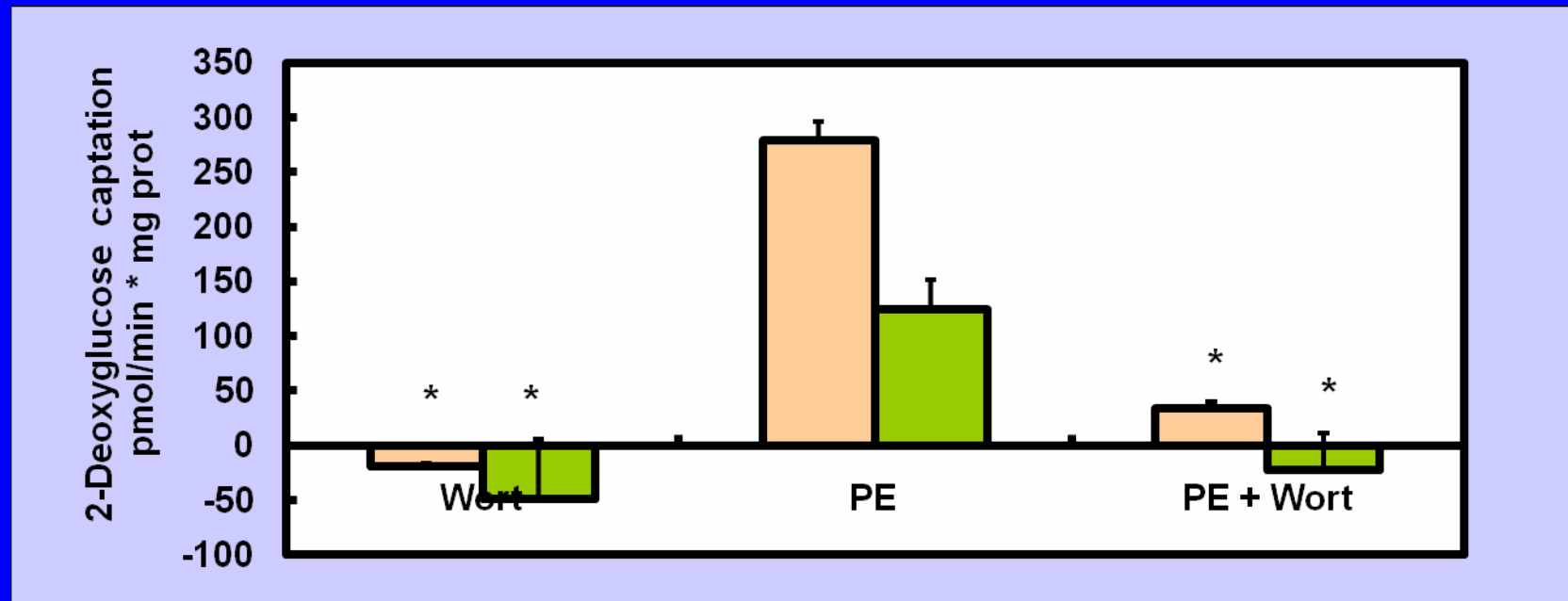


HepG2: Secreción de lípidos
3T3-L1: captación de glucosa
Raw: producción de NO

Dímero galado + trímero

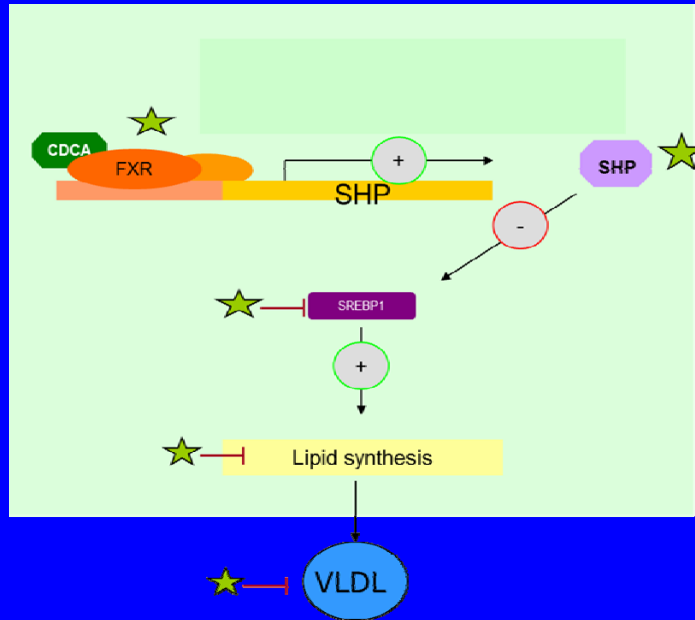
Mechanism of action

Wortmanina effect in the captation of glucose (myocytes L6E9, orange and adypocytes 3T3-L1, green)



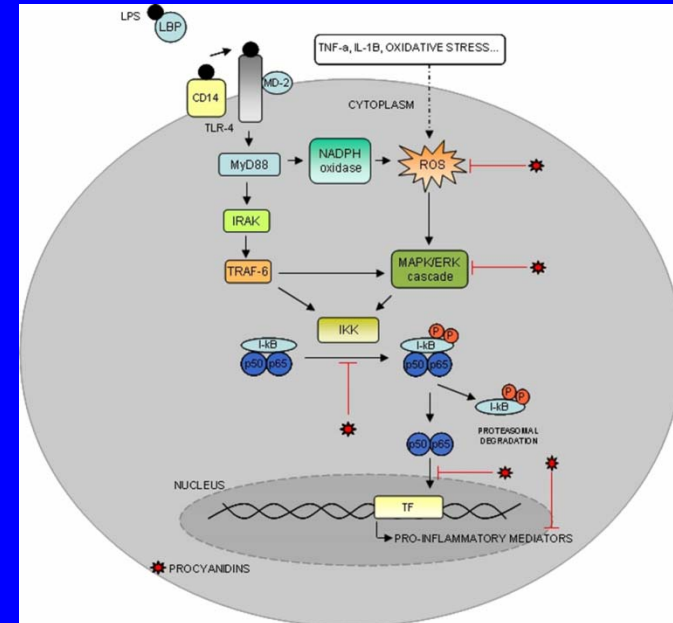
The increase in the glucose captation depending of the phosphatidyl-inositol-3-kinasa (PI-3-K) (enzyme involved in the glucose signaling pathway) in both cellular lines.

Mechanism of action

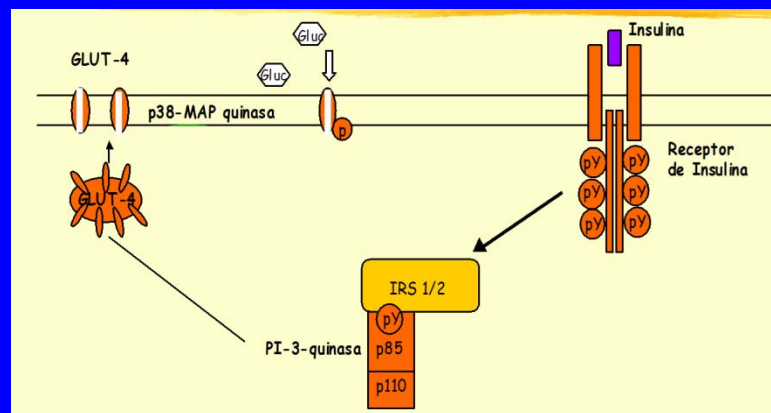


Mol Nutr Food Res (2008) 52, 1172.

Mol Nutr Food Res (2009) 53: 805-814



Free Rad Res (2011) 45: 611-619



Endocrinology (2004)145:4985-90.

J Nutr Biochem (2010) 21: 476-481



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