

# **ΕΝΔΟΜΗΤΡΙΟ ΠΕΡΙΒΑΛΛΟΝ ΚΑΙ ΜΕΛΛΟΝΤΙΚΗ ΚΑΡΔΙΑΓΓΕΙΑΚΗ ΝΟΣΗΡΟΤΗΤΑ**

**Αθανάσιος Δρίτσας MD,FESC  
Καρδιολόγος, Ωνάσειο ΚΚ**

# **Hungry in the womb: What are the consequences?**

## **Lessons from the Dutch famine**

**Poor nutrition at the very beginning of life** (before birth)  
leads to long term effects on mental and  
physical health

Roseboom TJ et al, Maturitas 70(2011):141-145



## **The Dutch Famine November 1944-May 1945**

**Smith et al 1947  
Am J Obstetrics Gynaecology**

**The effects of war time starvation in  
Holland on pregnancy and its product**

# **Hungry in the womb: What are the consequences?**

## **Lessons from the Dutch famine**

**People conceived during the famine:**

**Had a more atherogenic lipid profile**

**More responsive to stress and doubled the rate of CAD**

**Had higher incidence of type II diabetes**

**Were at increased risk of schizophrenia and depression**

**They performed worse on cognitive tasks**

Low birth weight as a risk  
factor for:



Coronary heart disease,  
Diabetes type II,  
Hypertension,  
Cognitive decline,  
Depression



# Low birth weight or length of gestation lead to cardiovascular disease

Programming of **physiological stress response**  
as an important linking mechanism

Alterations in arterial pressure  
Alterations in autonomic tone higher in females  
HPAA axis reactivity higher in males

Early life predictors of the physiological stress response later in life  
Kajantie et al, Neuroscience and Biobehavioral Reviews (2010)

# Birth weight and the programming of disease

## STRESS!!

Glucocorticoids during pregnancy

Excess glucocorticoids and fetal development

Maternal stress in pregnancy affects offspring brain

Role of the placenta and hydroxysteroid dehydrogenase (HSD2)

Reprogramming of the HPAA axis

(Linked with)

Low birth weight

Hypertension

Hyperglycemia

Increased HPA axis reactivity

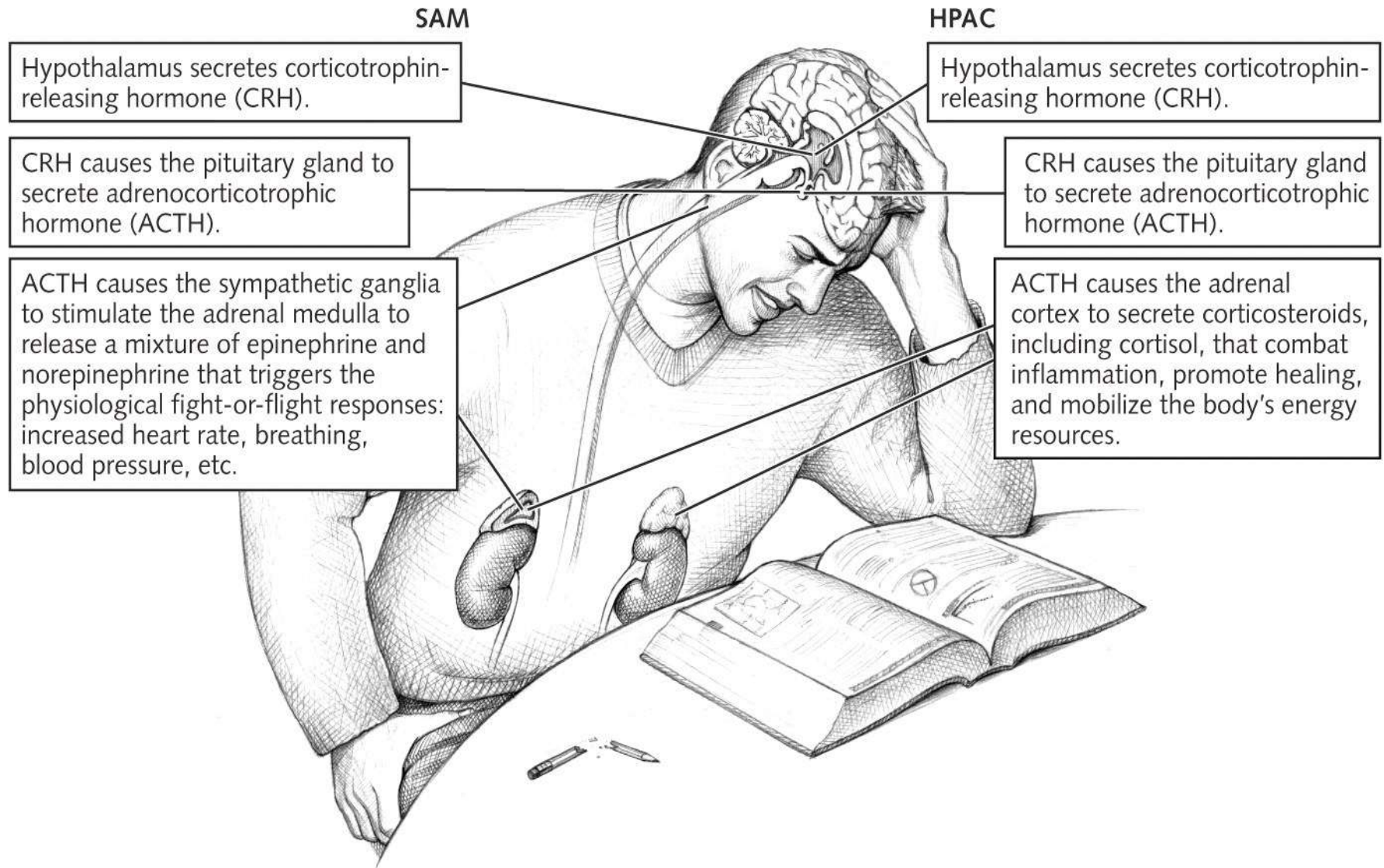
Increased anxiety related behavior

Platelet aggregation and thrombosis

Harris a et al, Hormones and Behavior (2010)

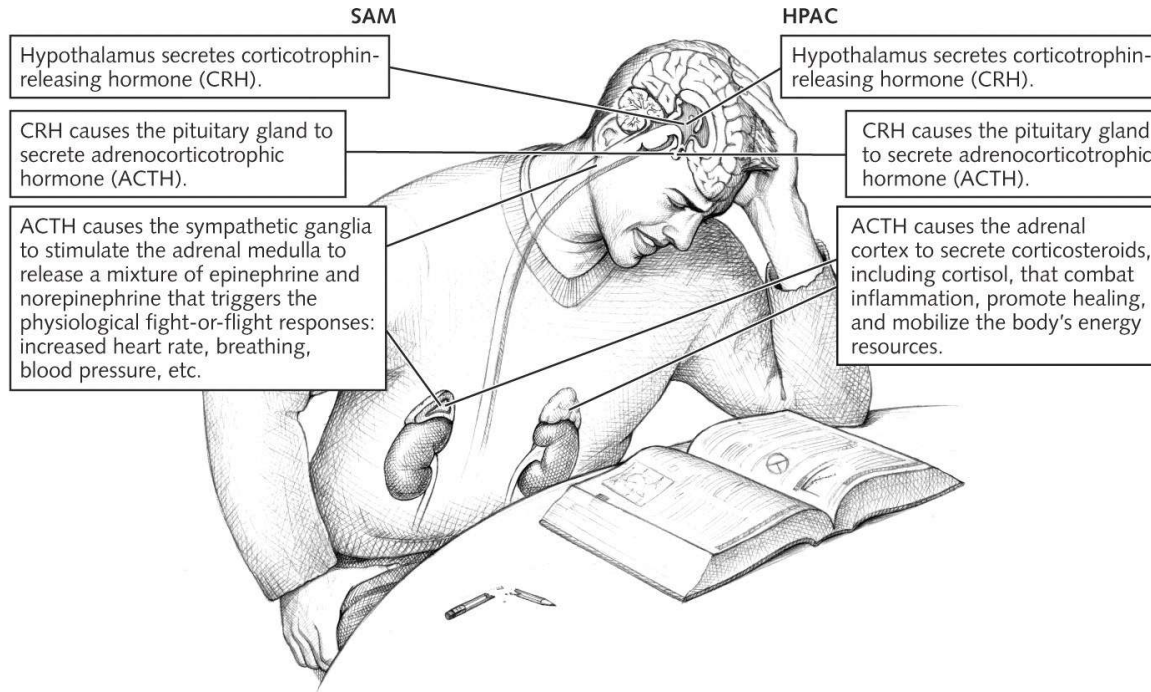


# Psychophysiological model of the stress response



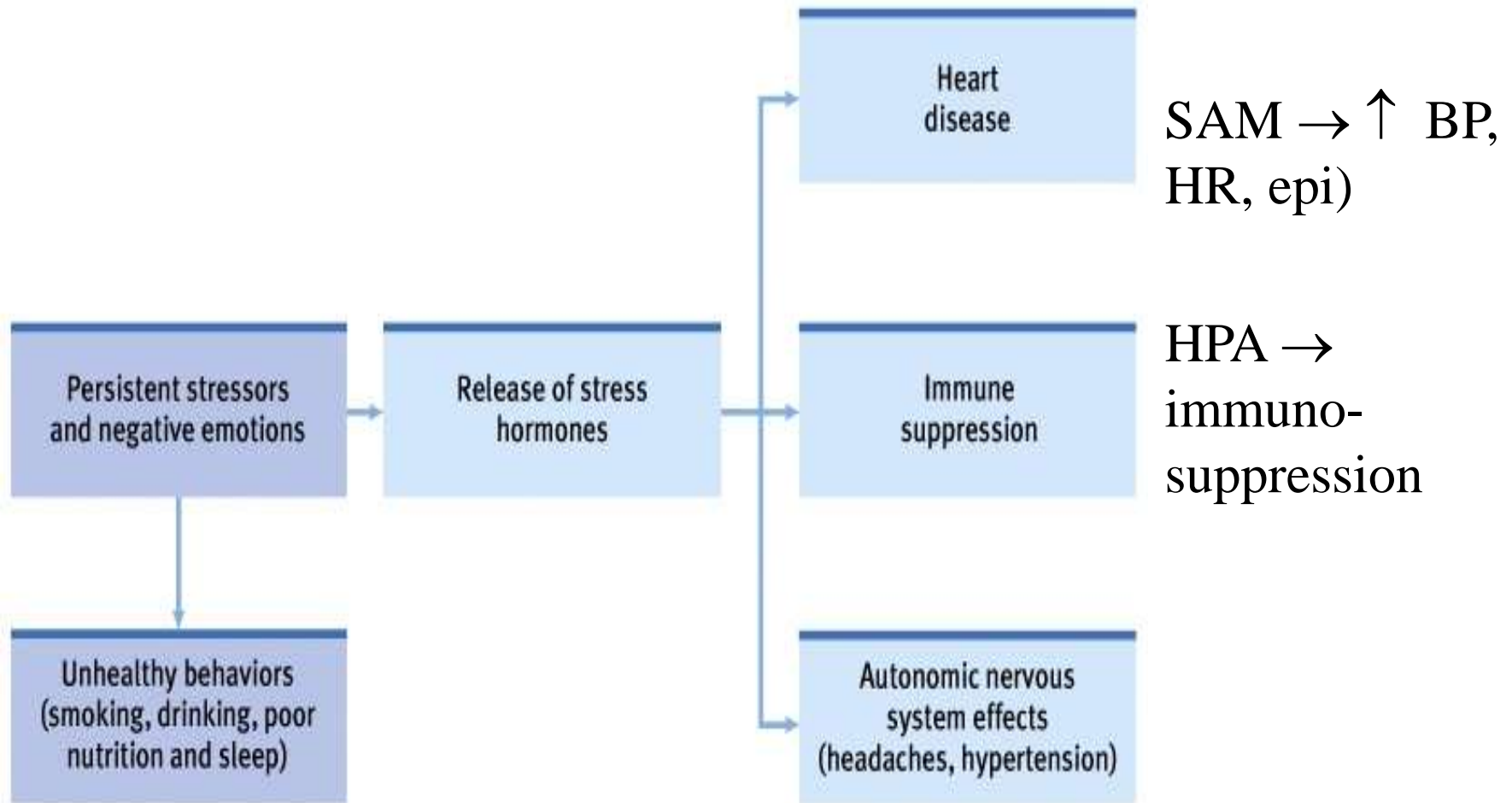


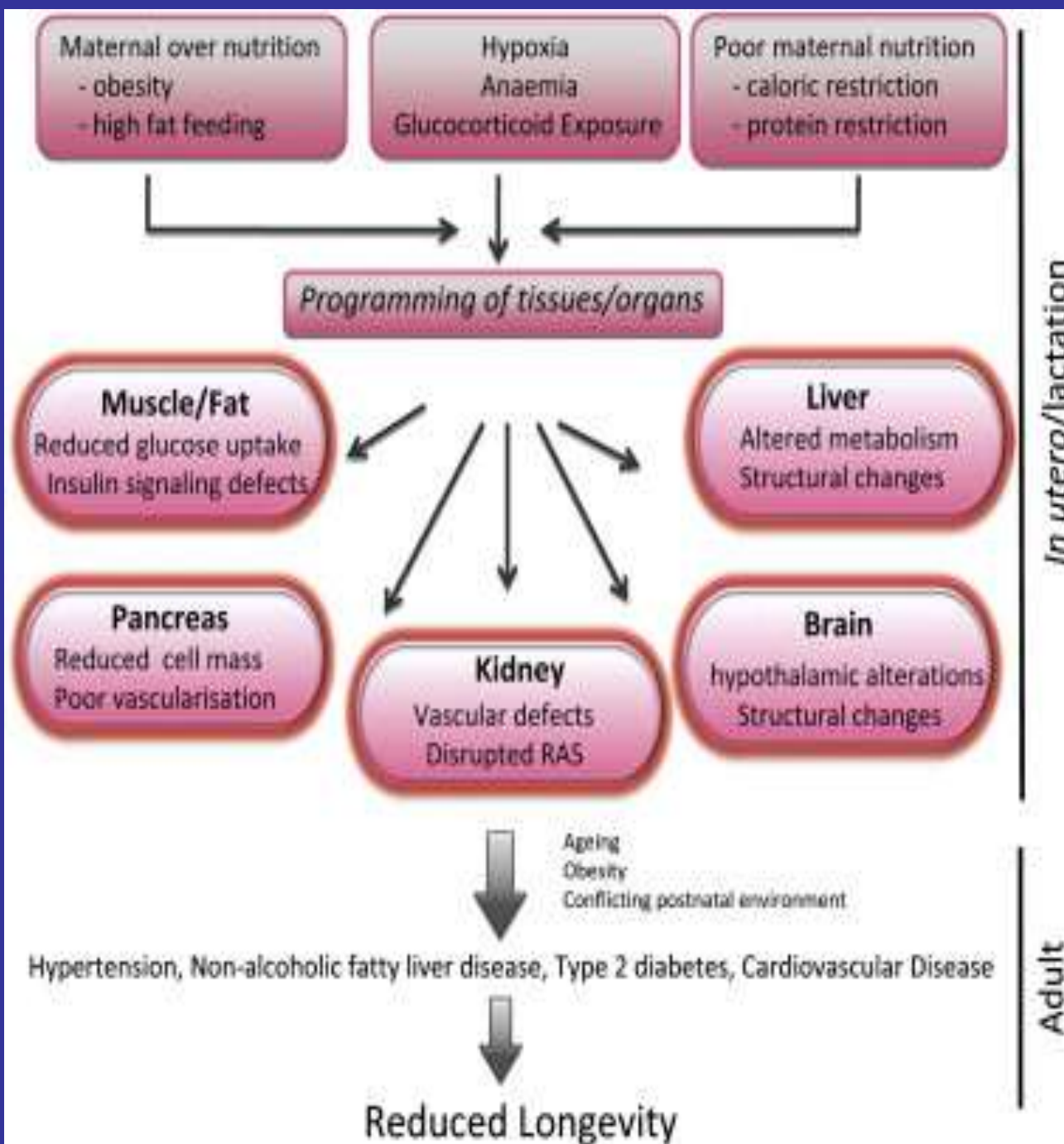
# Psychophysiological model of the stress response



This acute response is not typically problematic.  
Chronically, however, it's a different story...

# Health Consequences of Chronic Stress



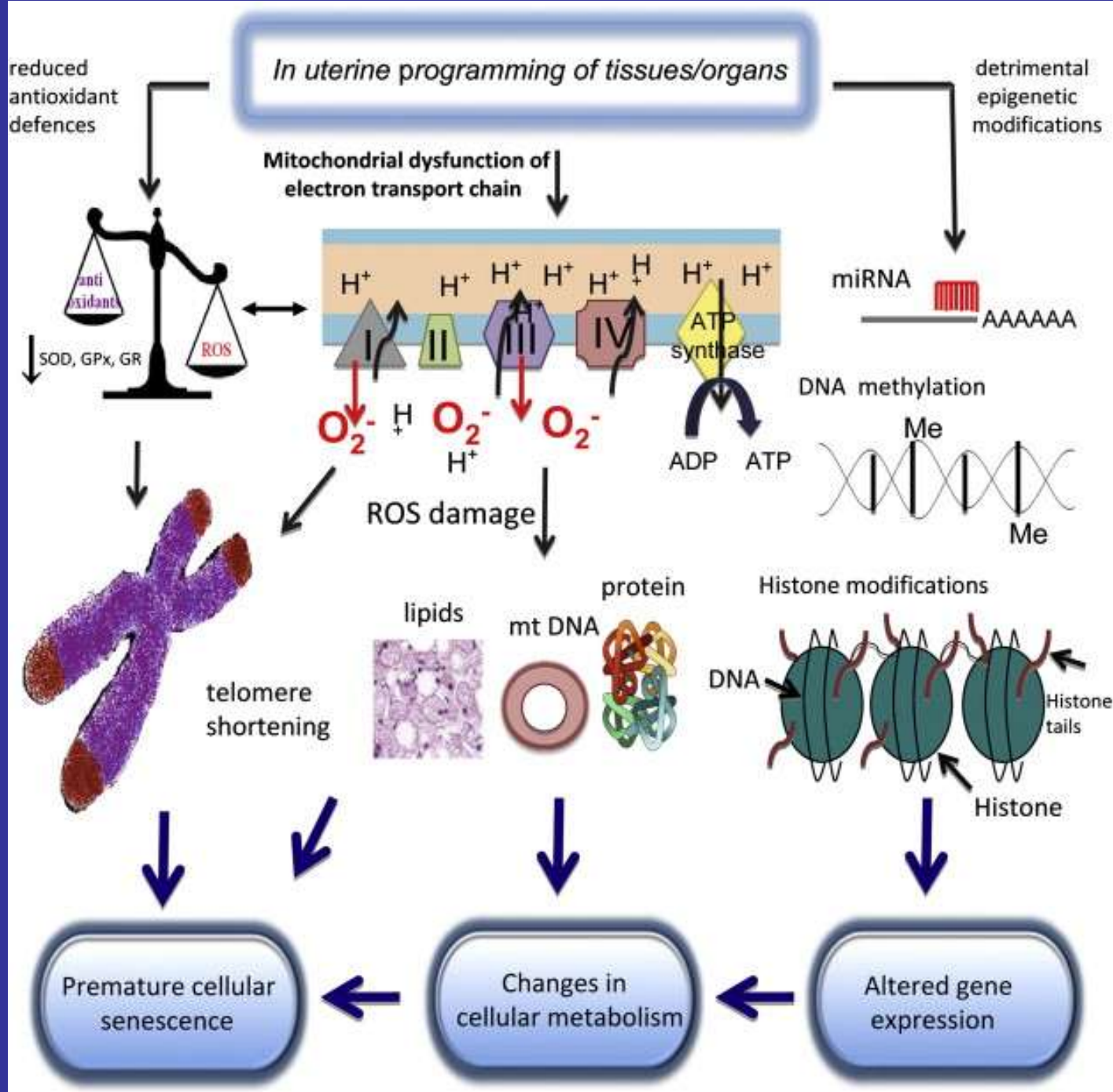


## IMPORTANCE OF INTRAUTERINE LIFE

Maternal hypo-nutrition  
Maternal over-nutrition

## Thrifty Hypothesis

Pathways linking early environment to long-term health,  
Progress in Biophysics and Molecular Biology  
2011, Barnes SK



**Epigenetics**

and

**Programming  
Life Span  
mechanisms**

# *Μουσική & έμβρυο*

Ικανότητα ακρόασης απο την 16η εβδομάδα κύησης  
(Hepper, 1992, 1994)

Συχνότητες <500 Hz → 80-95 dB (Gerhard & Abrams, 1996)

Ενδομήτριοι ήχοι & ρυθμοί → ανάπτυξη εγκεφάλου (Devlin  
1997)

Ικανότητα διαφοροποίησης ήχου της δικής του μητέρας  
(Righetti, 1996)

Αντίληψη μεταβολής καρδιακής συχνότητας & αναπνοής  
(Righetti, 1996)

## *Μουσική και νεογνό*

Οι περισσότερες μητέρες (80%) κρατούν απο ένστικτο τα βρέφη στην αριστερή πλευρά. Αυτό έχει σχέση με την ακρόαση του καρδιακού παλμού της μητέρας και φαίνεται οτι ηρεμεί τα νεογνά και βρέφη.

*Dr. Lee Salk (1973)*







## *Κατευναστικοί ήχοι*

*Σχετίζονται με ανάμνηση ήχων της εμβρυικής ζωής*

*ήχοι αιματικής ροής στον πλακούντα (placental flow)*

*ήχος καρδιακού παλμού μητέρας (mothers heart beat),*

*Andante ! 70/κατα λεπτό.*

*σσοσος (ελληνικά)*

*hush, shush, shah (Yiddish)*

*ushuru (Ethiopian)*

*enshallah (Egyptian)*

## ΘΕΡΑΠΕΥΤΙΚΗ ΜΟΥΣΙΚΗ

Βρέφη & νεογνά

**\*Επίδραση ενδομήτριων ήχων  
(womb sounds)**

*αύξηση βάρους προώρων  
αύξηση περιμέτρου κεφαλής  
μείωση καρδιακής συχνότητας  
αύξηση κορεσμού αρτ. αίματος*



**\*Dr. Fred Schwartz  
Piedmont Hospital, Atlanta**

# ΘΕΡΑΠΕΥΤΙΚΗ ΜΟΥΣΙΚΗ

## Μονάδες εντατικής θεραπείας νεογνών

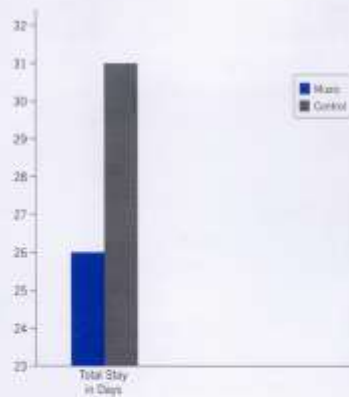
Womb sounds

Relaxation music

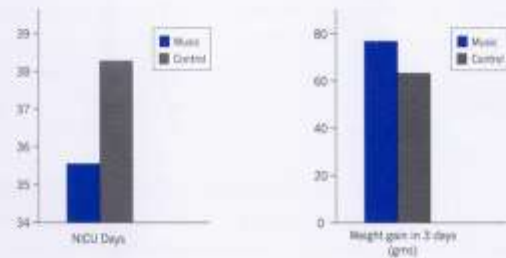
Andante

Νανουρίσματα με φωνή μητέρας

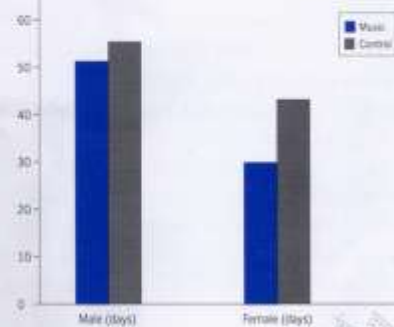




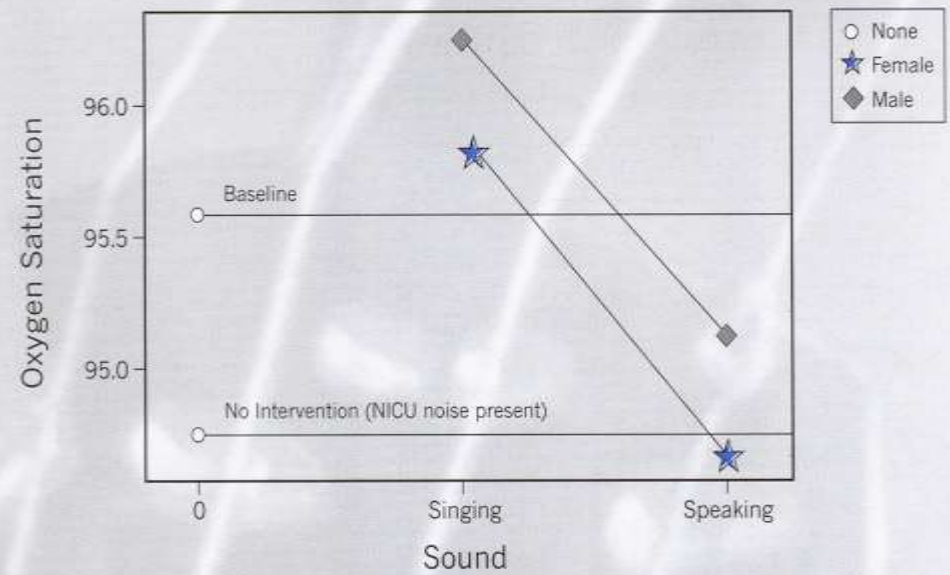
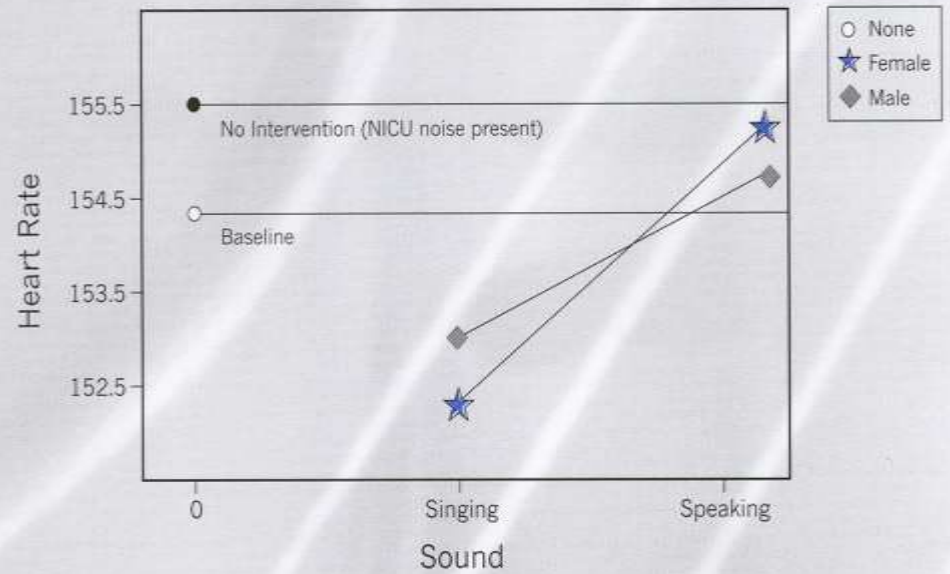
Σχήμα 1.



Σχήμα 2.



Σχήμα 3.

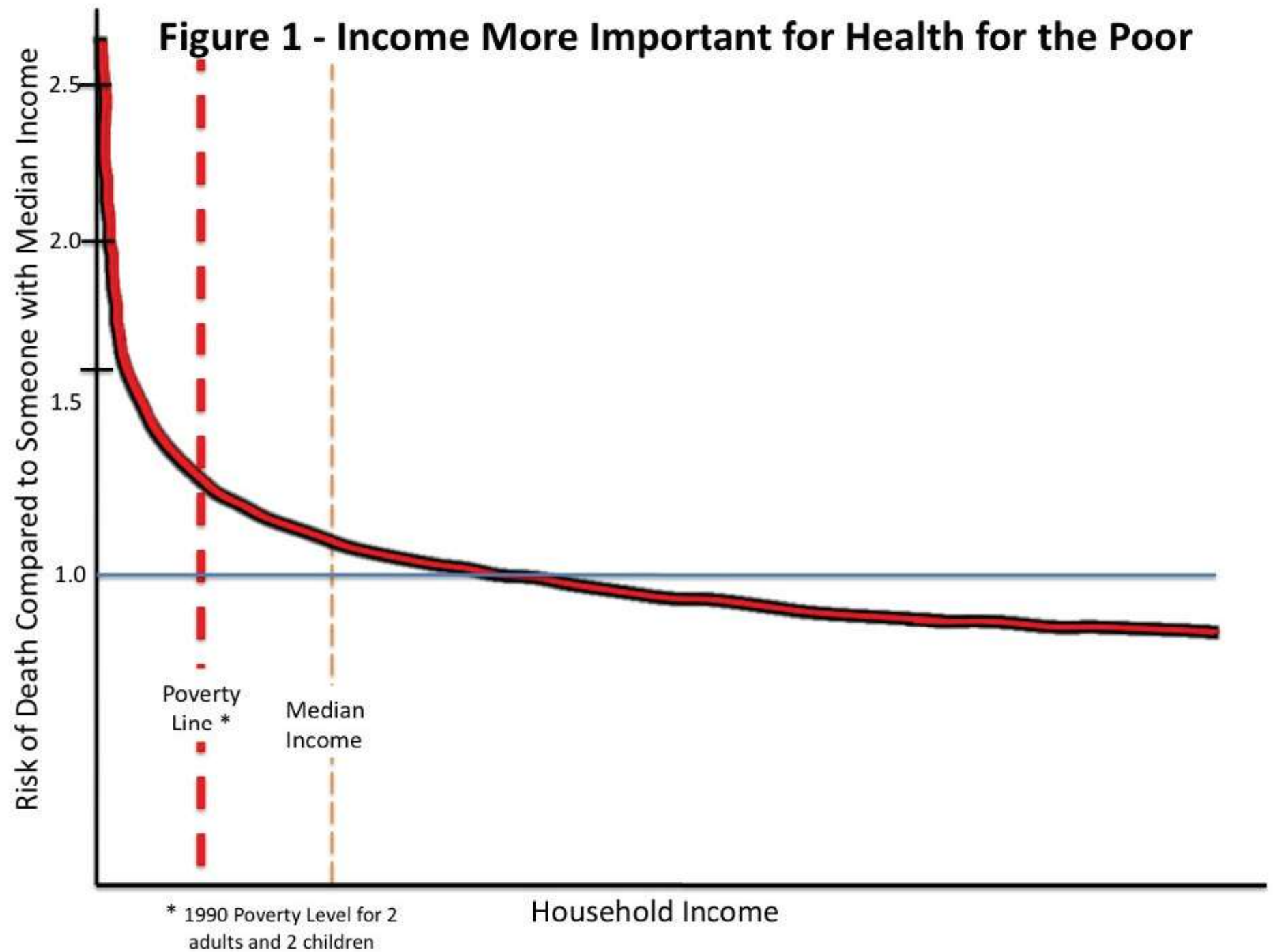


# **INEQUALITIES AND HEALTH**

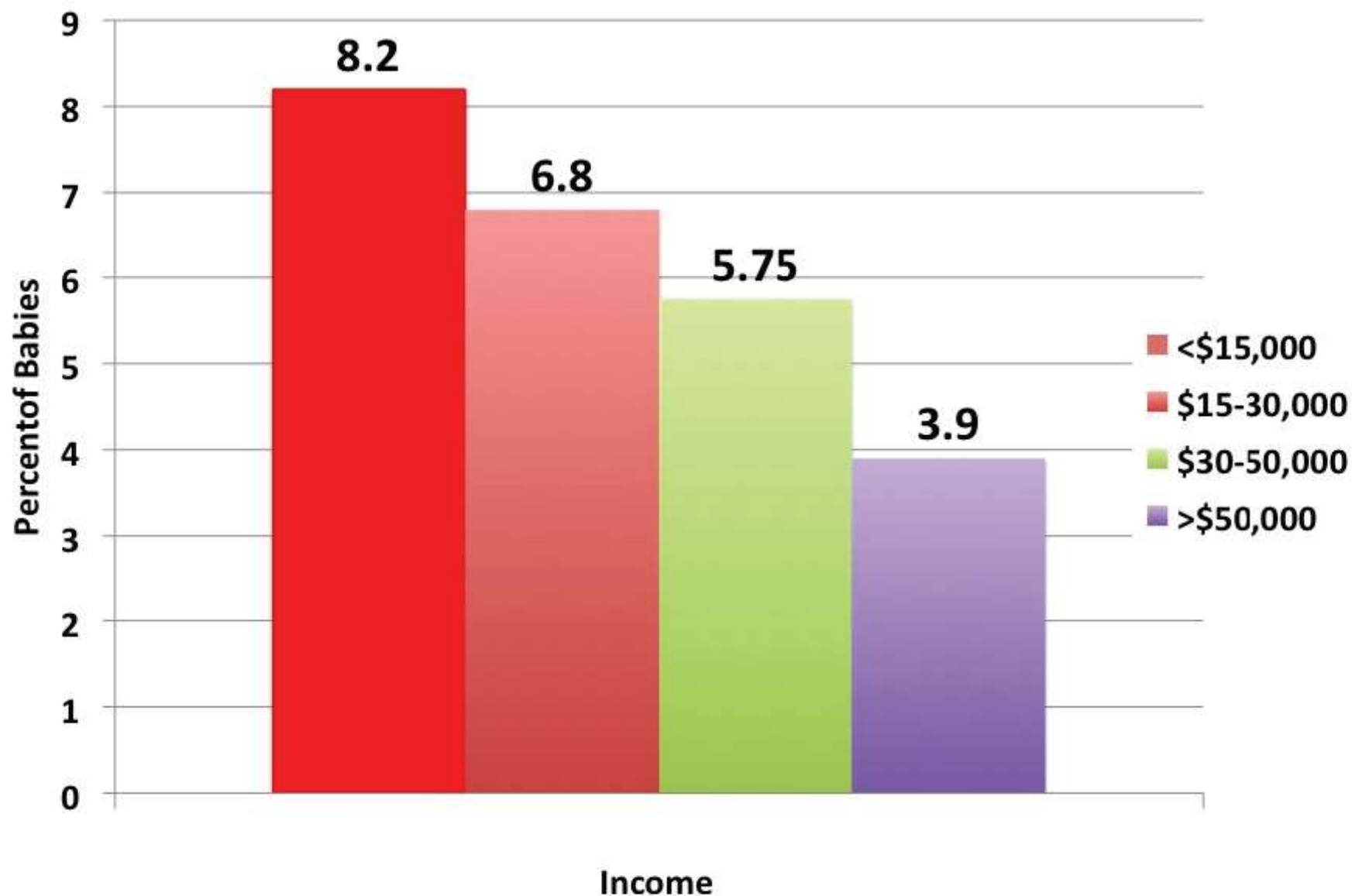
**Poverty pays more to health,  
A report, September 2009**

**Prof. George Caplan,  
Dept. of Epidemiology,  
University of Michigan, USA**

**Figure 1 - Income More Important for Health for the Poor**

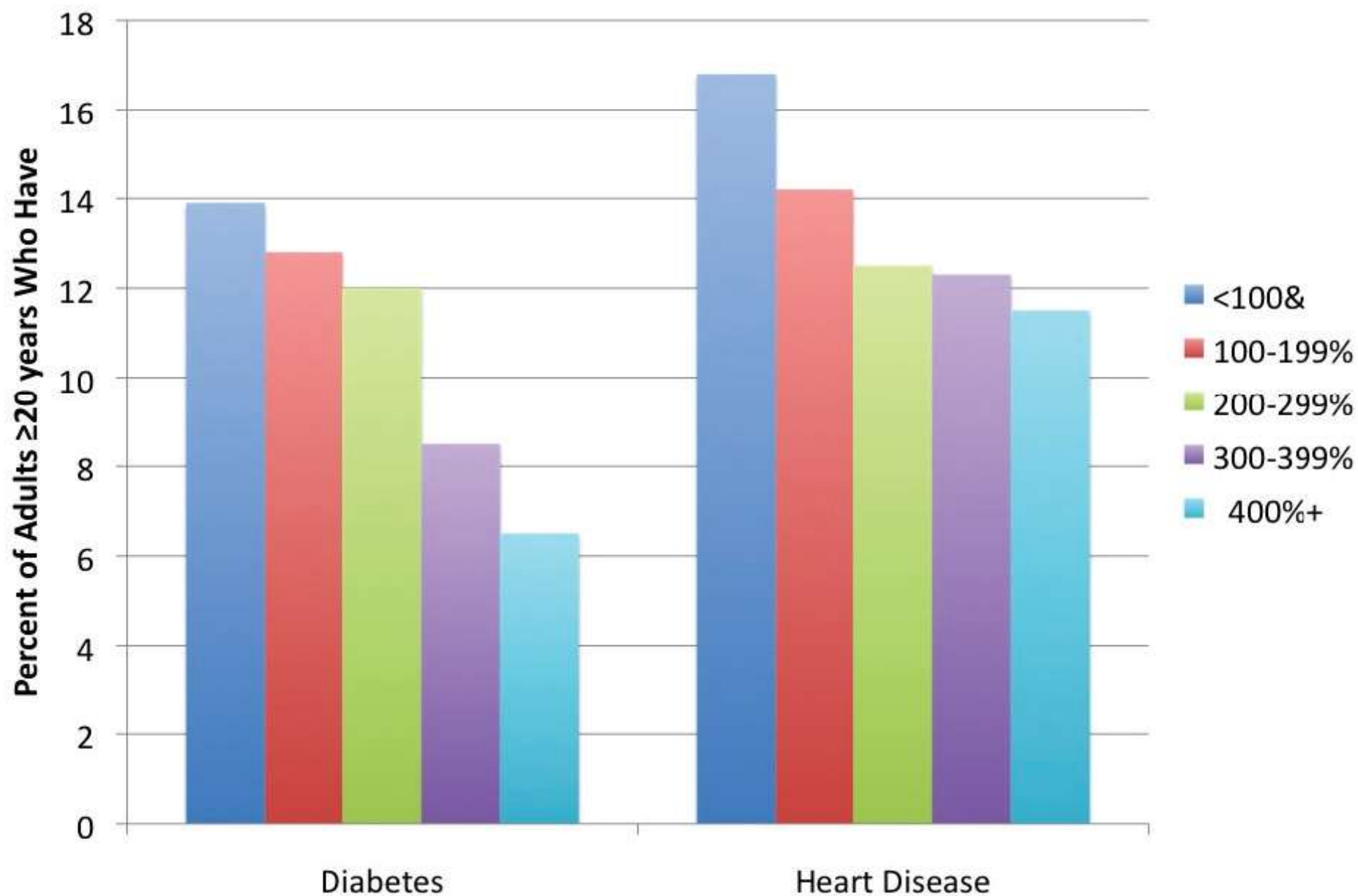


**Figure 2 - Low Birth Weight More Common in Poor Babies**

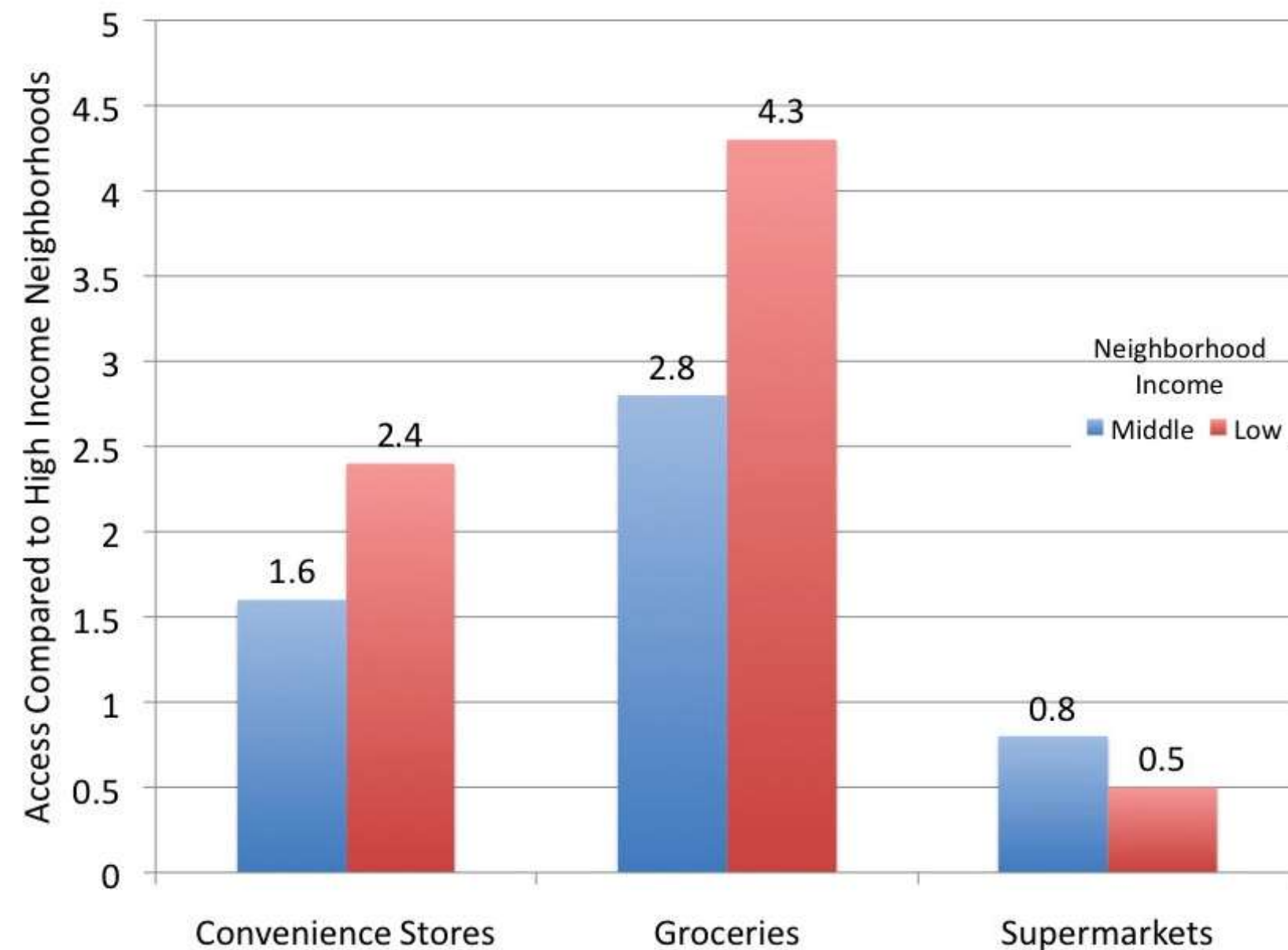




**Figure 4 -- The Poor Have More Heart Disease and Diabetes**



**Figure 8 -Availability of Healthy Food is Worse in Poor Neighborhoods**



# The world today!

Αυτός ο κόσμος δεν θα αλλάξει ποτέ! (Κεμάλ, Ν.Γκάτσος)

## Malnutrition vs Overnutrition



One billion people worldwide go hungry everyday and at the same time  
More than one billion are obese or overweight (2011)