# Beyond Move More, Eat Less: Considerations in Pediatric Obesity Prevention and Treatment


## Colony S. Fugate, D.O., FACOP

Diplomate, American Board of Obesity Medicine
Clinical Professor of Pediatrics
Director, Family Health and Nutrition Clinic
Oklahoma State University Center for Health Sciences
colony.fugate@okstate.edu

# Relevant Disclosures and Resolutions

I have no relevant financial relationships or affiliations with commercial interests to disclose.

# Objectives

After attending this presentation, participants will be able to:

1. Recognize the complex biological underpinnings of obesity
2. Discuss obesity within an ecological framework
3. Describe the *Division of Responsibility for Feeding*
4. Explain the relationship of Adverse Childhood Experiences to chronic disease
5. Identify practical therapeutic interventions which are consistent with the Tenets of Osteopathic Medicine

# Tenets of Osteopathic Medicine

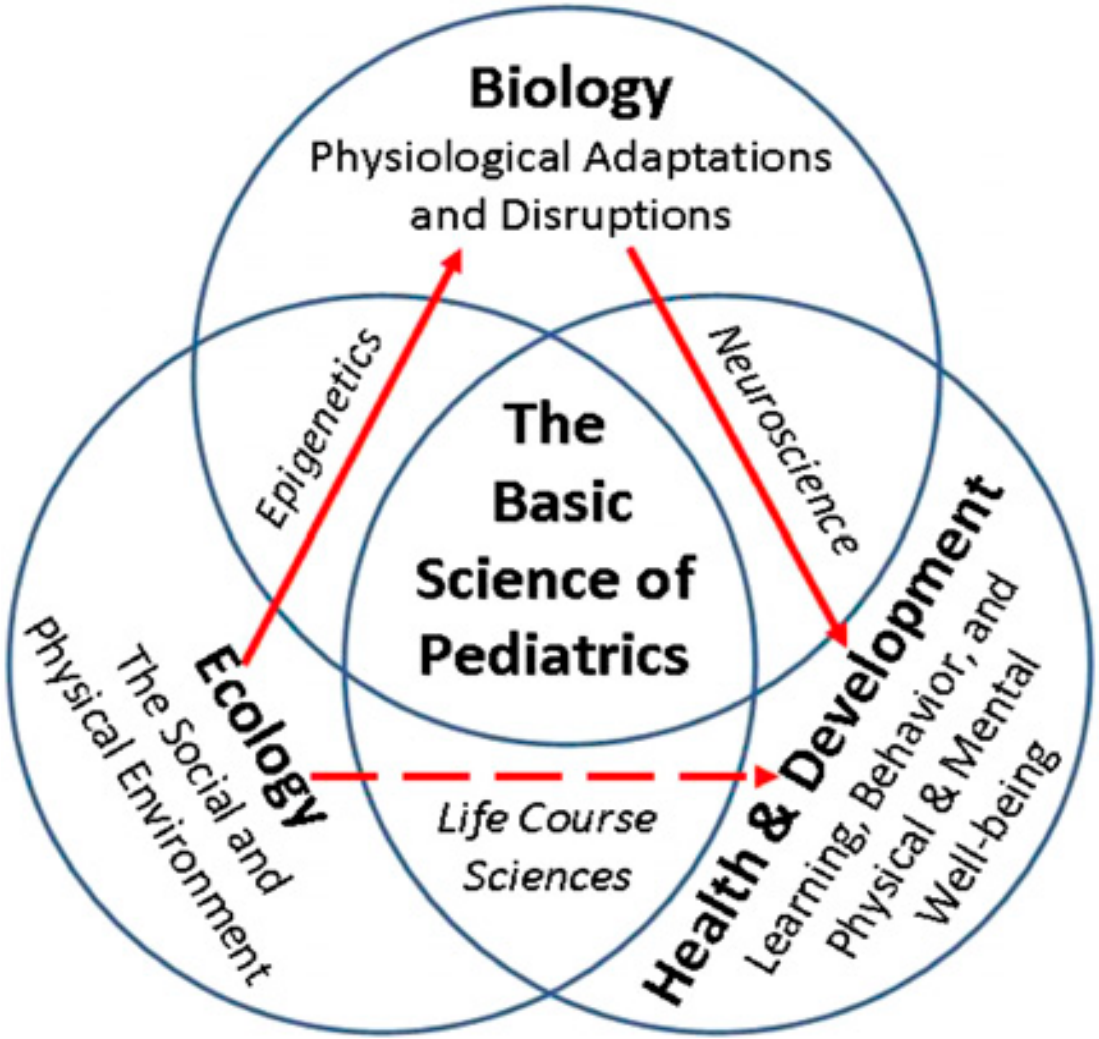
The body is a unit, the person is a unit of body, mind, and spirit

The body is capable of self-regulation, self-healing, and health maintenance

Structure and function are reciprocally interrelated

Rational treatment is based upon an understanding of the basic principles of body unity, self-regulation and the interrelationship of structure and function.

# An Ecobiodevelopmental Framework




Shonkoff, et al 2012

# Objective #1

Recognize the complex biological underpinnings of obesity

# Energy Homeostasis

**Intake:**

**Hunger**

**+**

**Satiety**

**Output:**

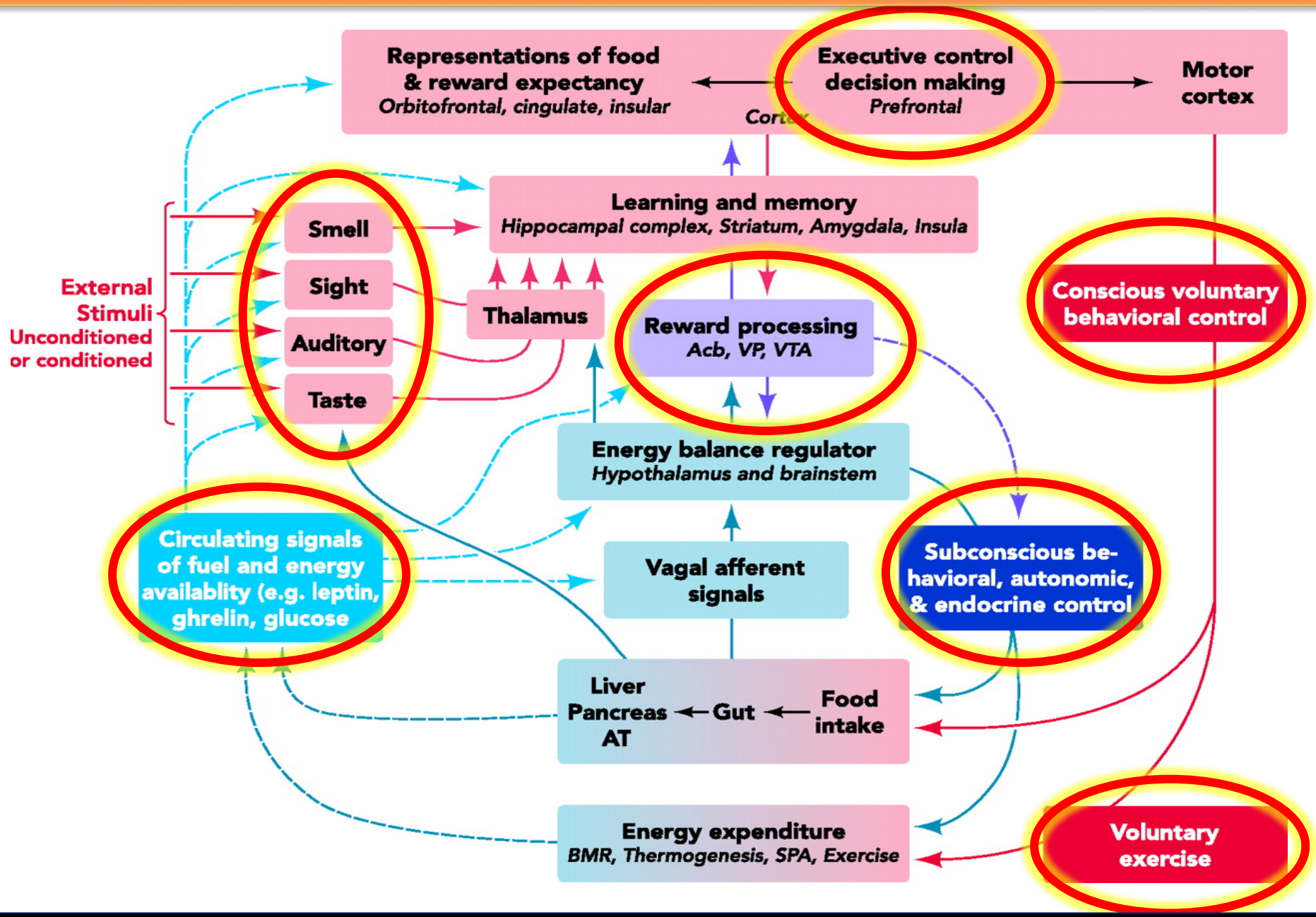
**Metabolic rate**

**+**

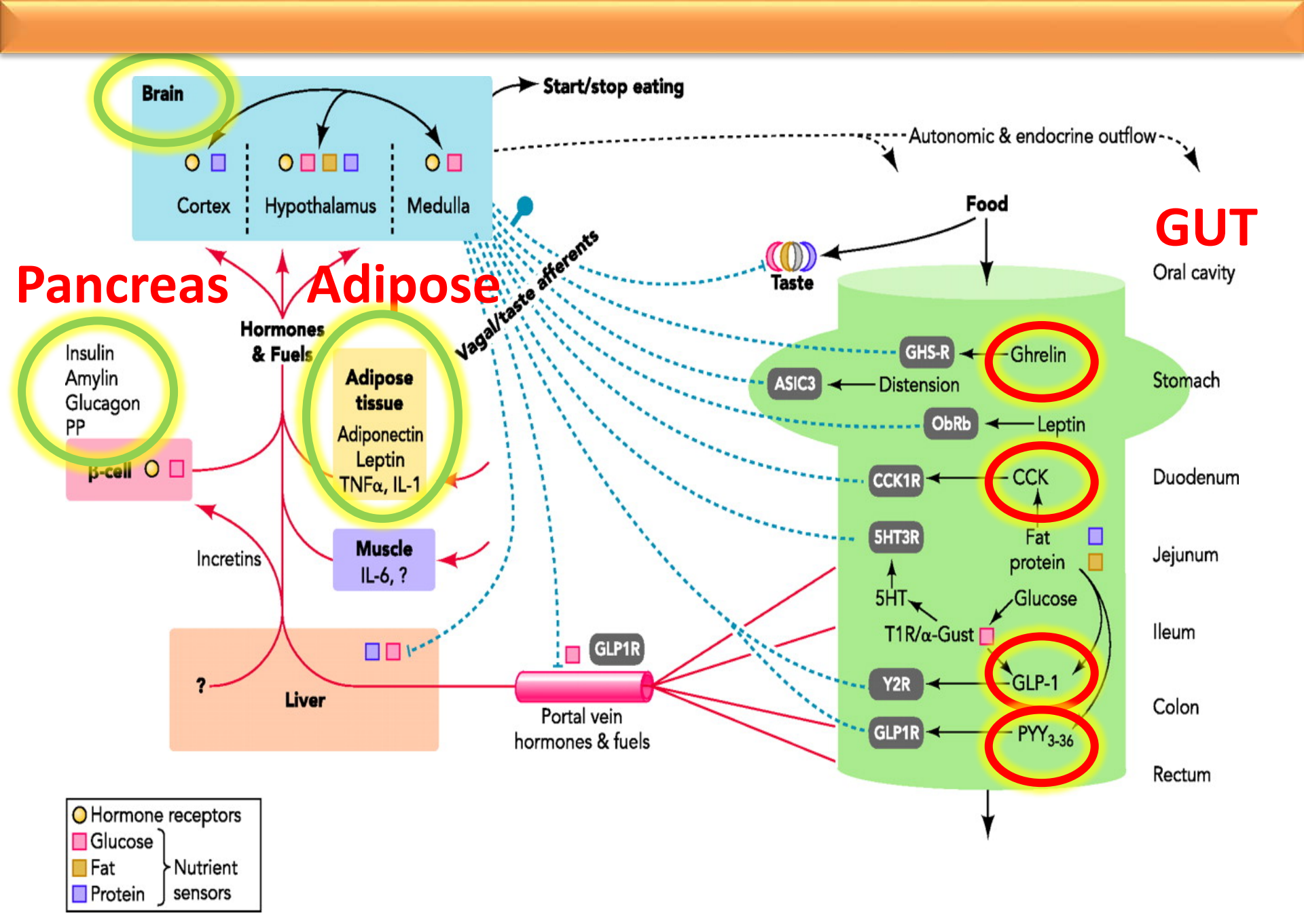
**Activity**

**in**

**out**

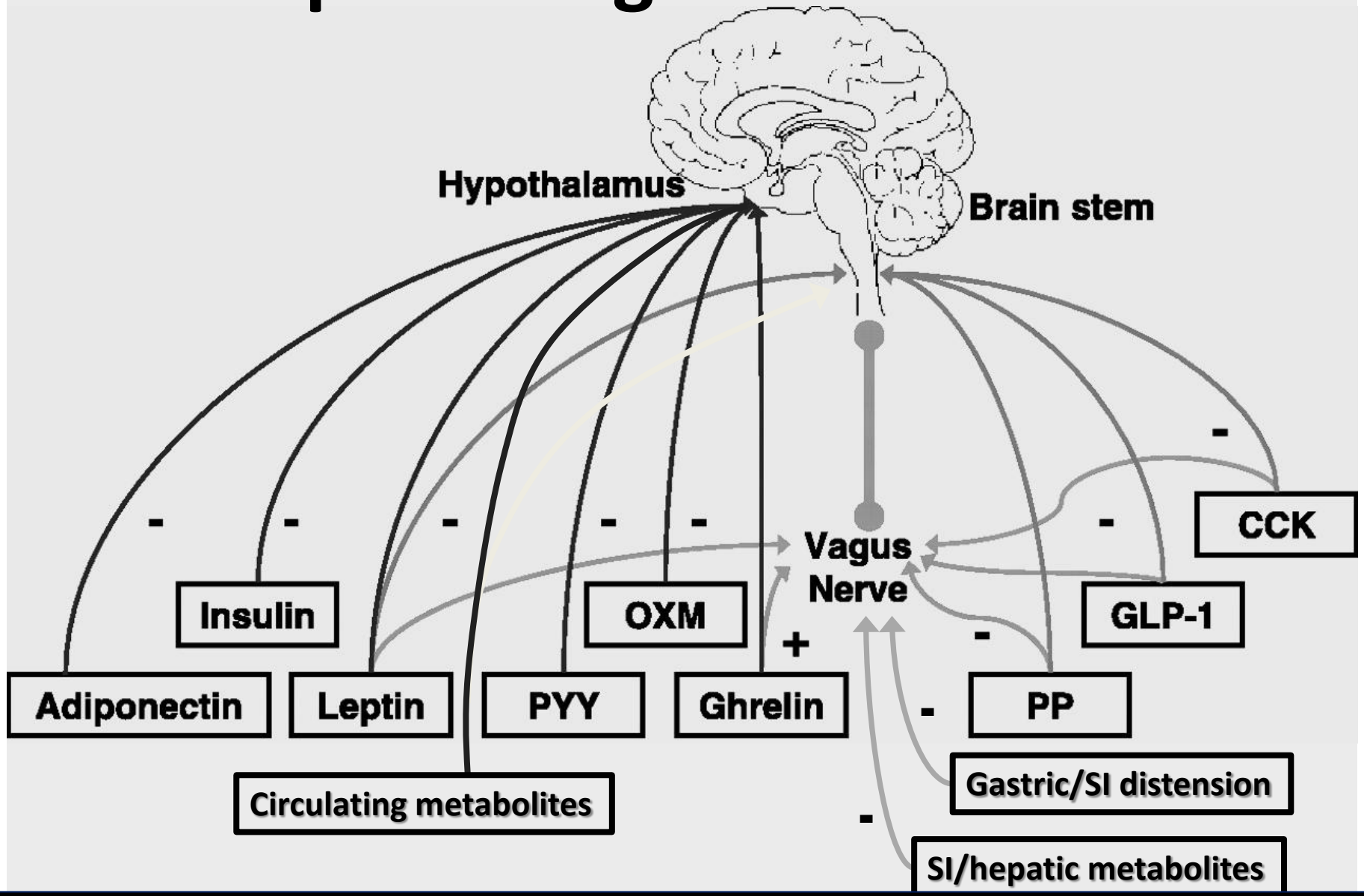



 Zheng H and Berthoud H Physiology 2008; 23: 75-83

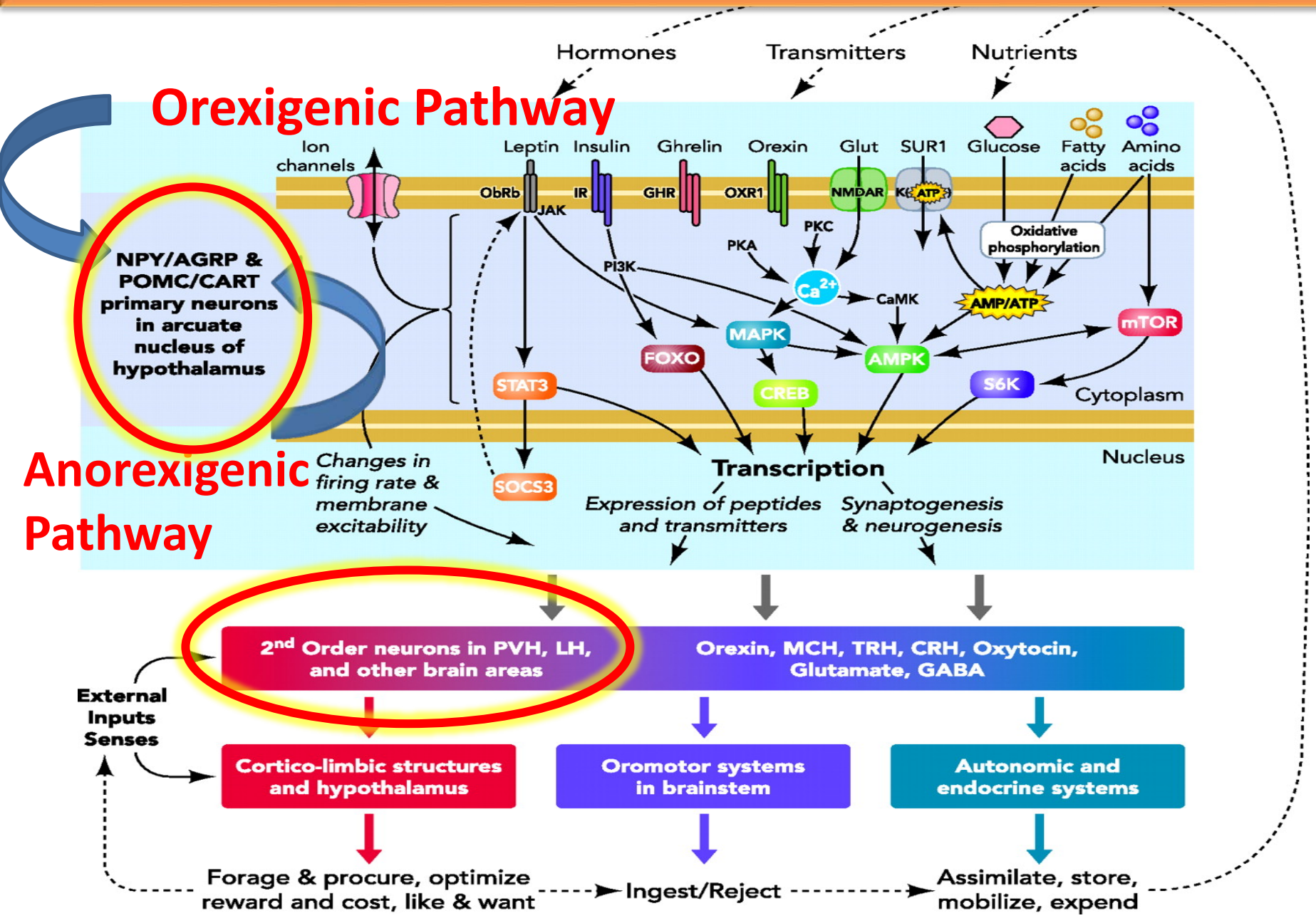



2008 by American Psychological Society Zheng H and Berthoud H Physiology 2008; 23: 75-83

# Peripheral signals to the CNS



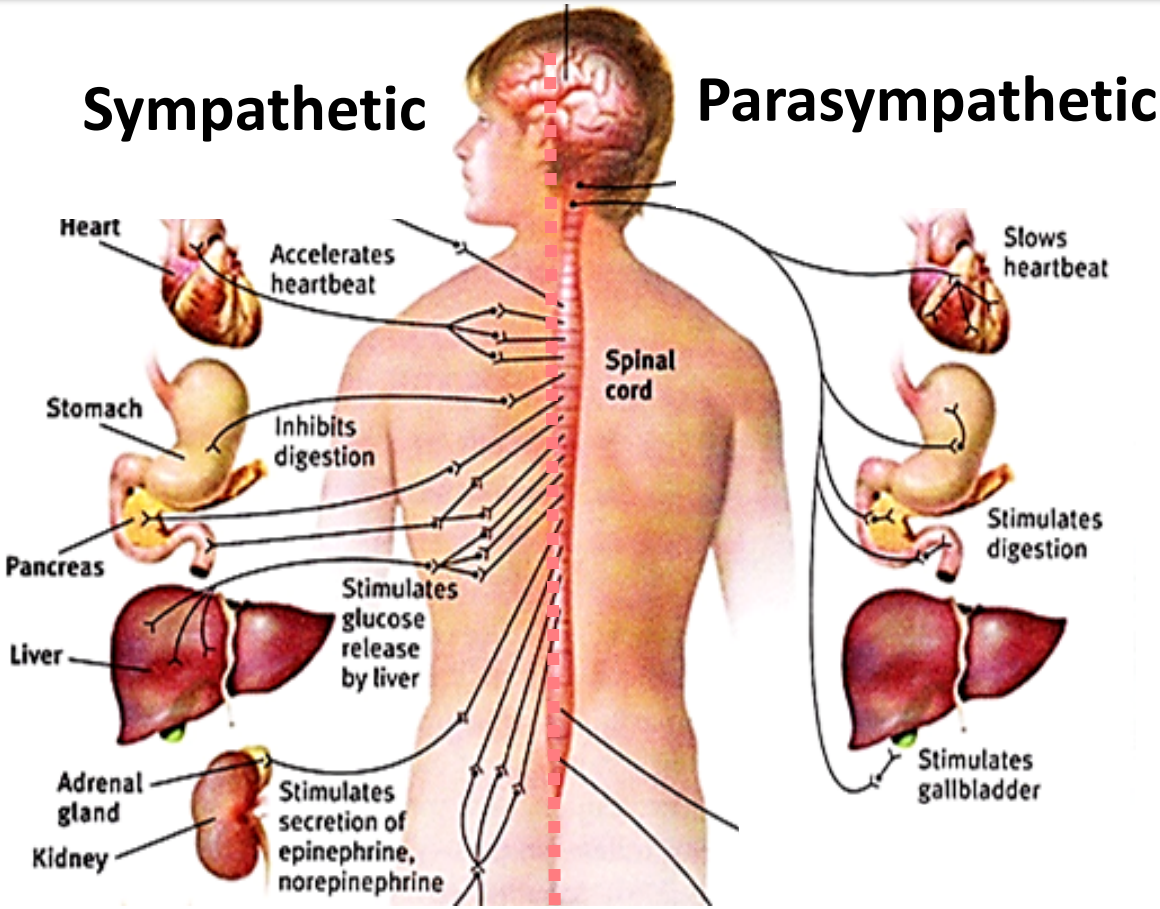

Adapted from Stanley et al., Physiol Rev 2005



# Hypothalamic Hormone Systems and Energy Homeostasis

| | | |
|---|---|---|
| ***HPA axis*** | cort → | ↑ lipolysis<br>↓ insulin sensitivity<br>↑ gluconeogenesis |
| | GH → | ↑ lipolysis<br>↑ gluconeogenesis |
| | $T_3/T_4$ → | ↑ metabolic rate<br>↑ thermogenesis<br>↑ lipolysis<br>↑ gluconeogenesis |
| ***HPG axis*** | E2 → | ↑ metabolic rate<br>↑ locomotor activity<br>↓ food intake |

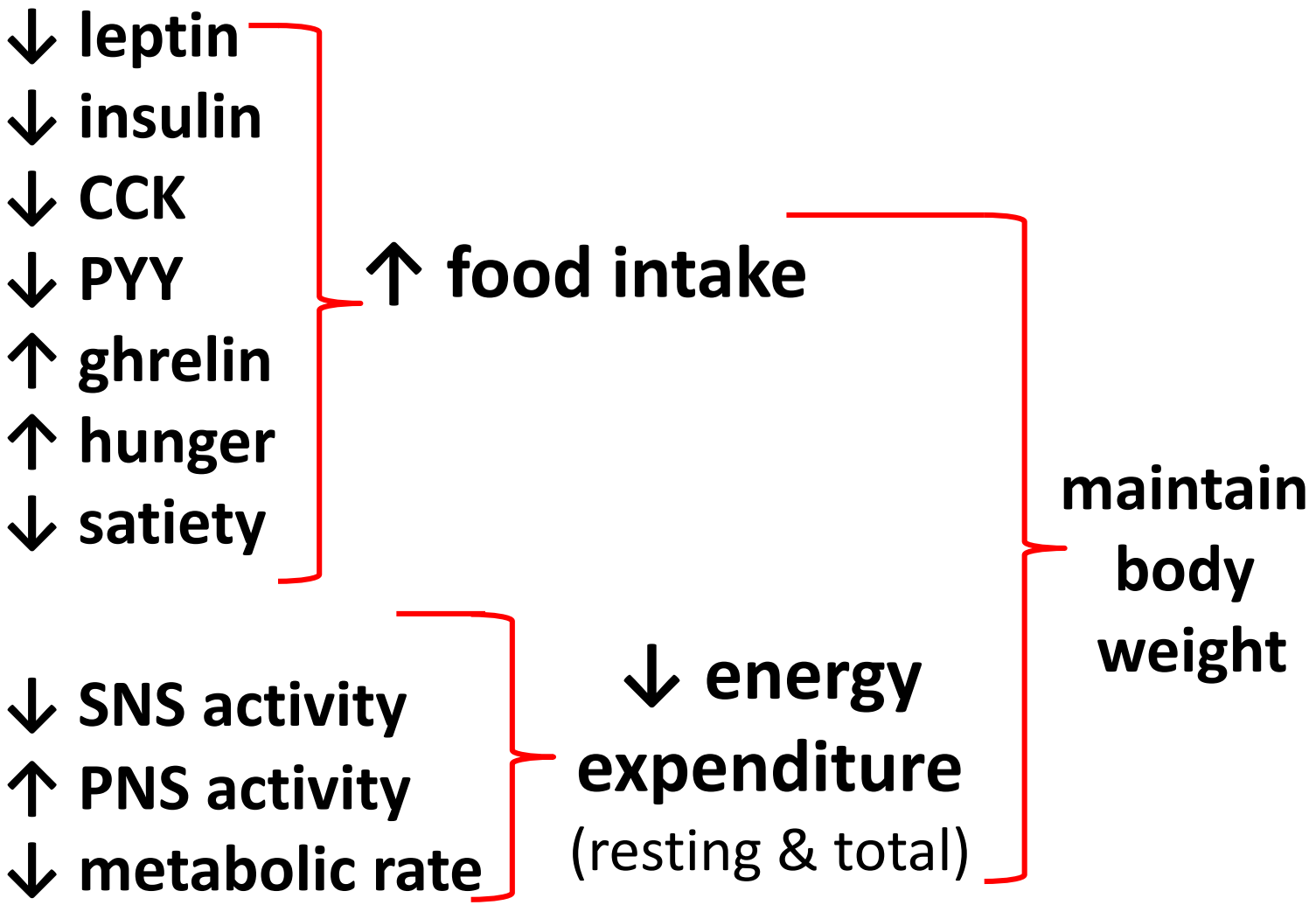
# Autonomic Nervous System and Energy Homeostasis



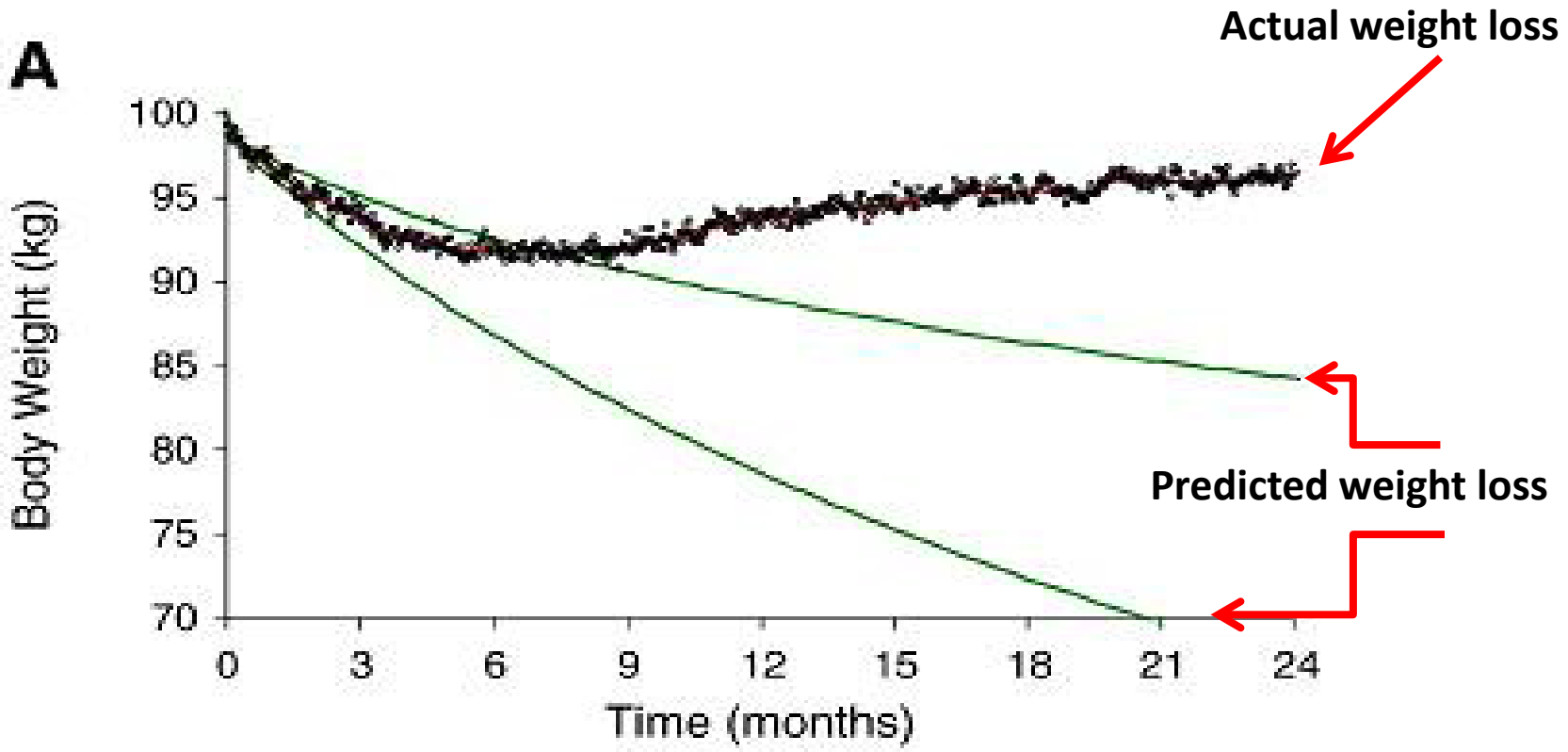

↑ energy usage
↑ availability

↓ energy usage
↑ energy storage

# Adaptive Reponses to Weight Loss



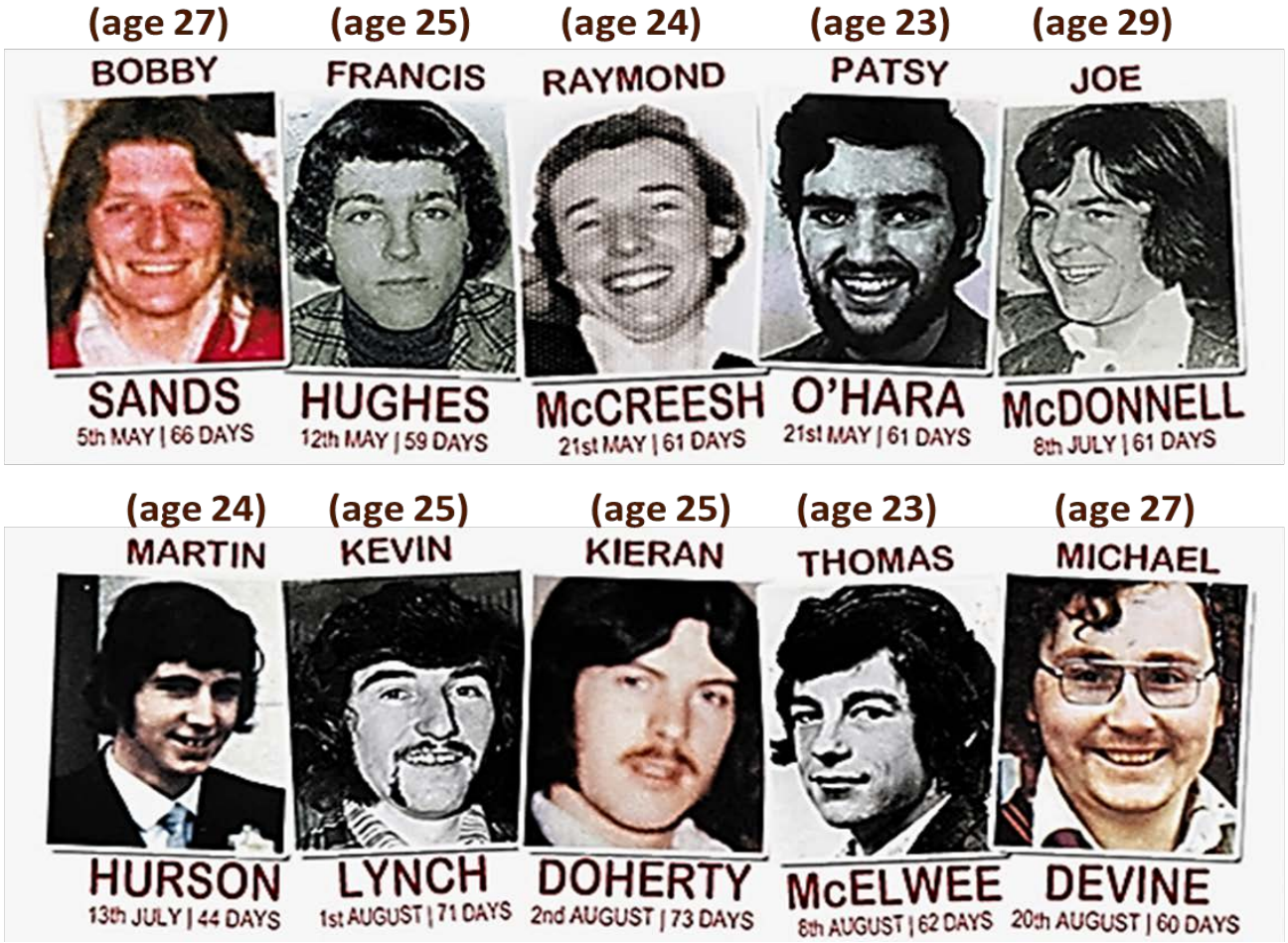
# Adaptive Reponses to Weight Loss




Chow & Hall: Physiology and Behavior, 2014

# Adaptive Reponses to Weight Loss

## 1981 Irish Republican Army hunger strikers



# Metabolic Adaptation

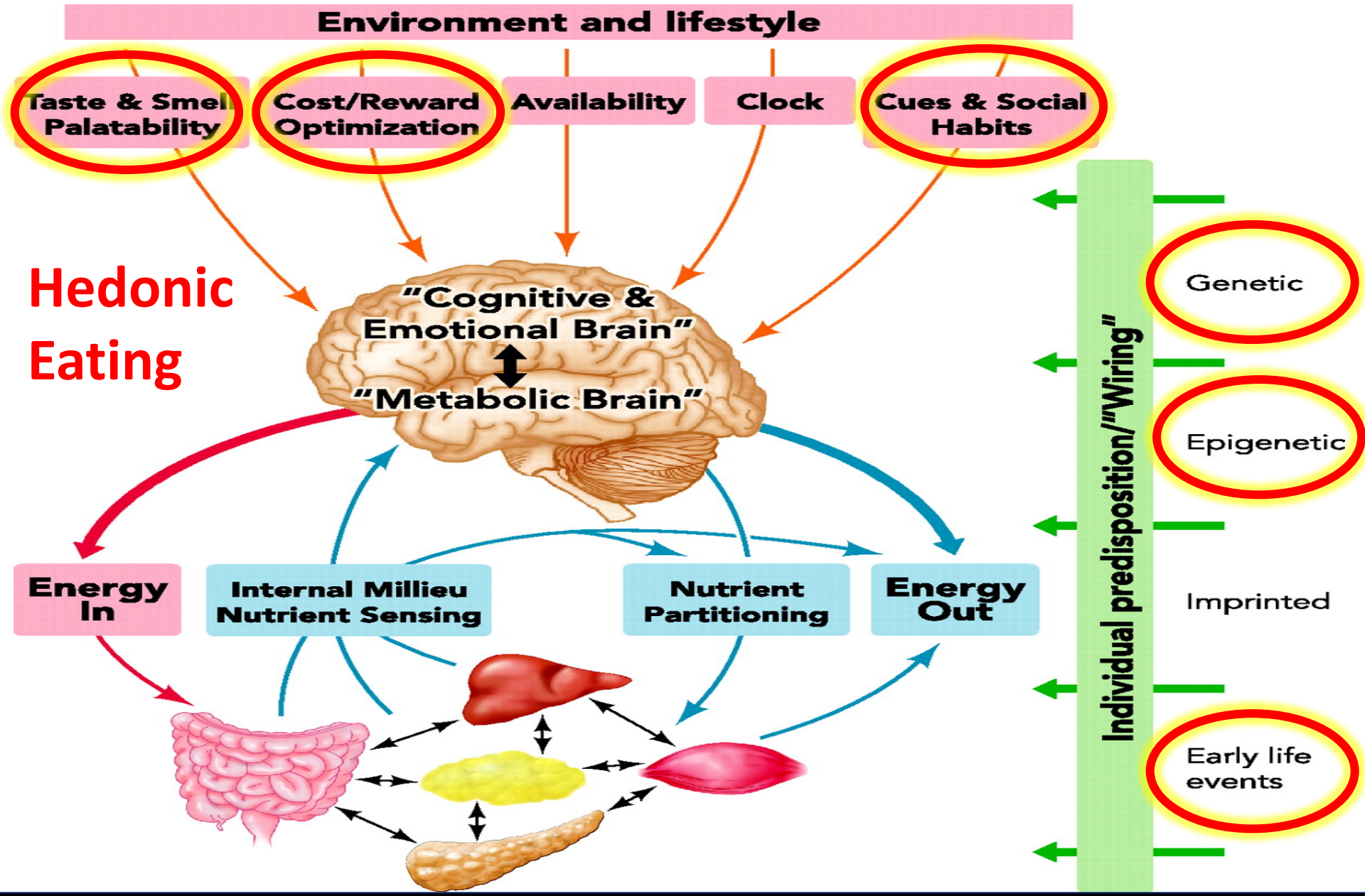
So, with dieting and weight loss…

Hunger goes up

Satiety goes down

Energy expenditures decrease

This effect last for years!

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# Osteopathic Approach

# Objective #2

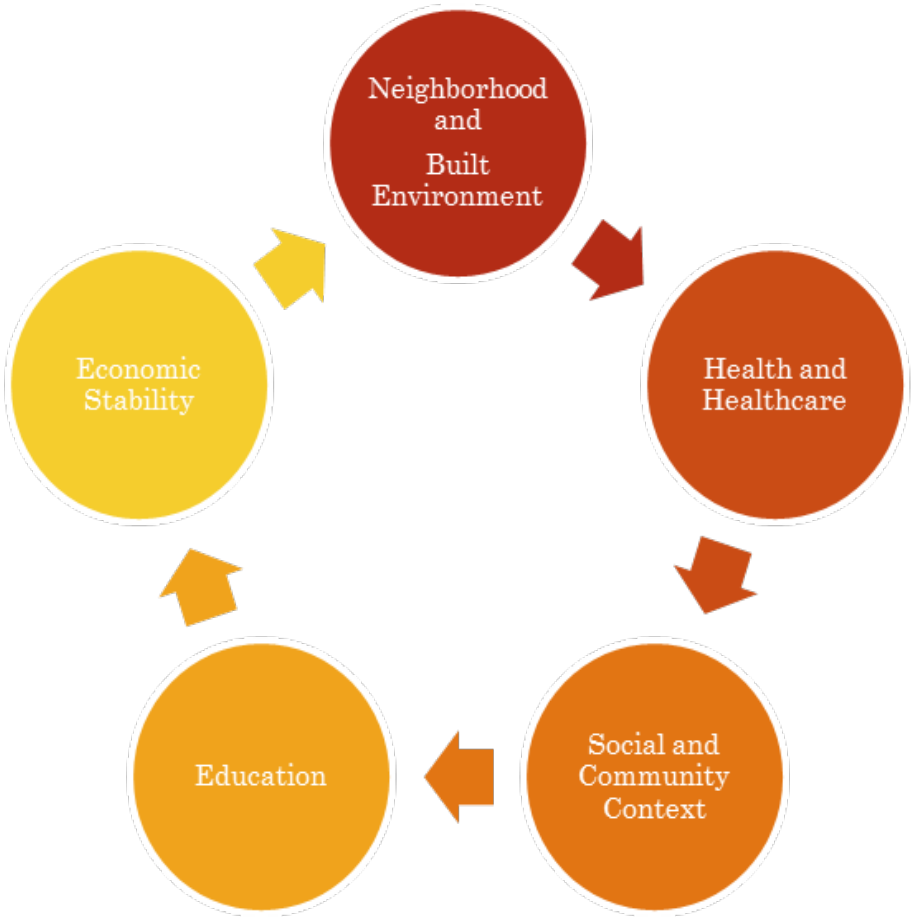
Discuss obesity within an ecological framework

# Social Ecological Model


The social ecological model recognizes multiple levels of influence and the idea that behaviors both shape and are shaped by the social environment. -NIH

Office of Behavioral and Social Science Research, NIH Bronfenbrenner, U. (1977).

# Social Determinants of Health



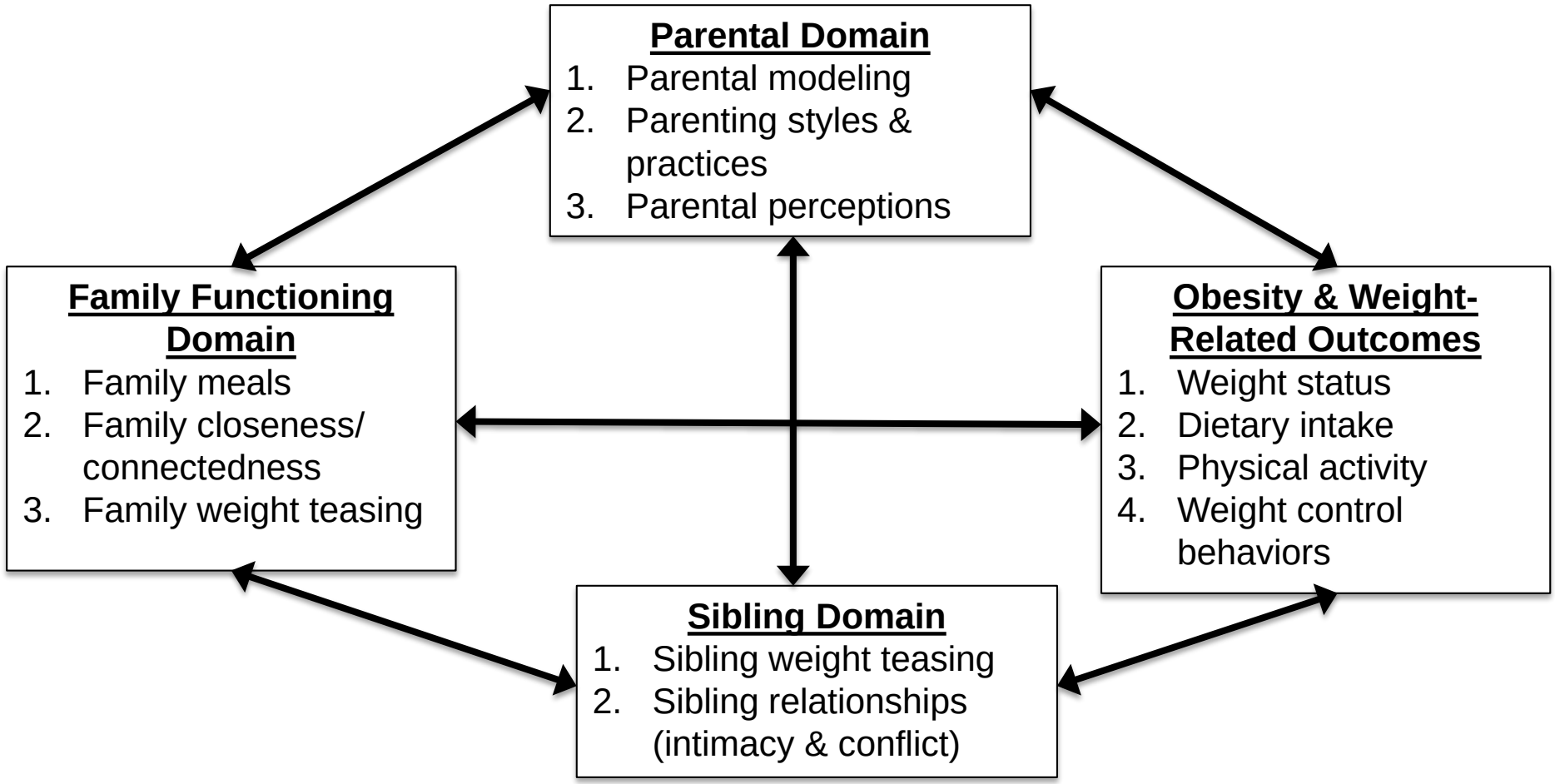

The social determinants of health are the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics. -WHO

# Osteopathic Approach

# Objective #3

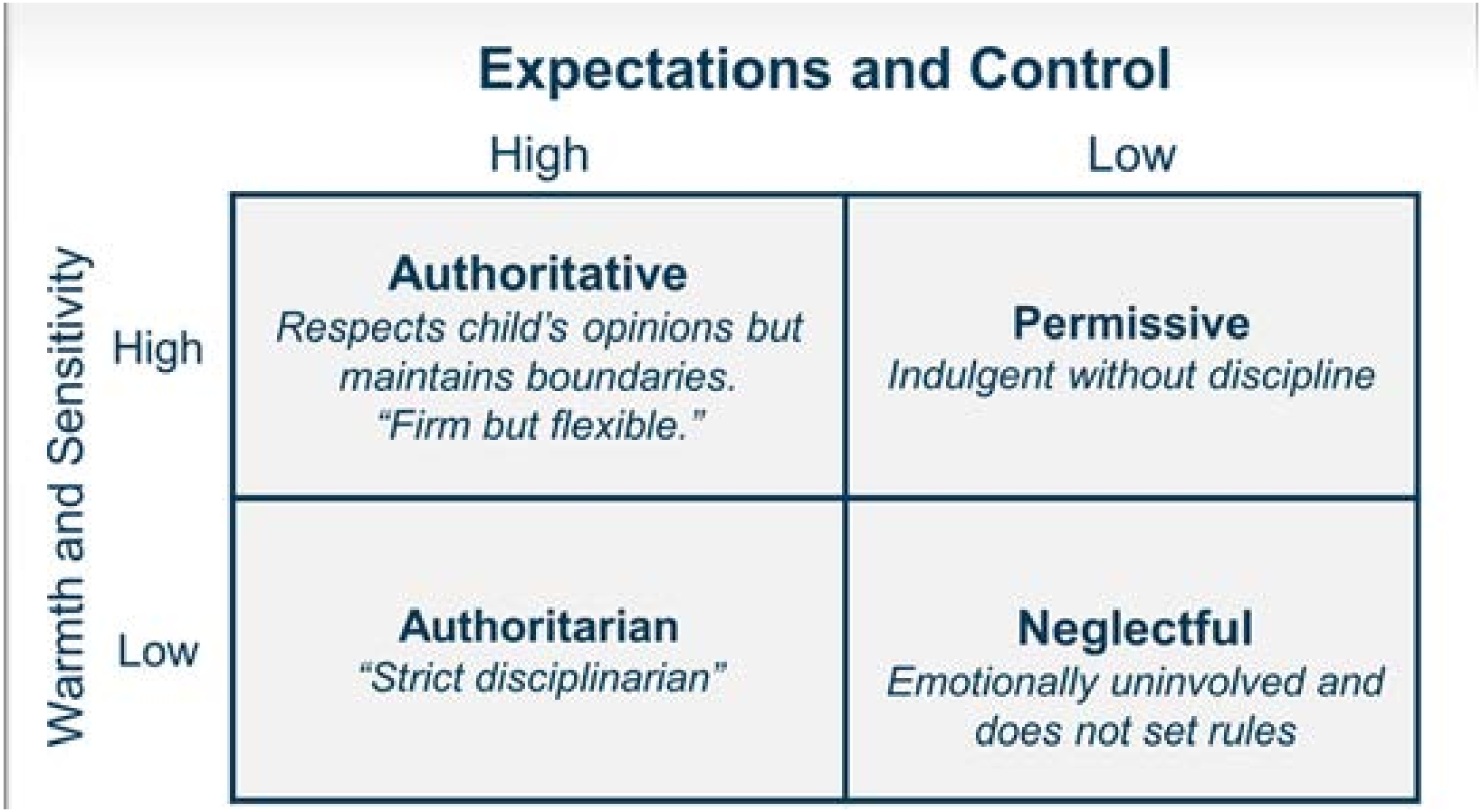
Describe the *Division of Responsibility for Feeding*

# Families Correlates of Child Obesity




Berge, J. M. (2009). A review of familial correlates of child and adolescent obesity: What has the 21st century taught us so far? *International Journal of Adolescent Medicine and Health, 21,* 457-483.

# Parental Styles



# Parental Feeding Practices

- Parental modeling of health behaviors
  - Associated with lower BMI & healthy dietary intake
  - Contributes to children's increased liking of novel foods.

- Parental feeding practices related to weight gain:
  - Restriction/control
    - Regulation of when, what and how much children eat
  - Pressure/prompting to eat
    - Pushing to eat
  - Instrumental/emotional feeding
    - Food for reward or emotion regulation

# Sibling Domain

- Sibling weight teasing
  - Positively associated with female weight status, body dissatisfaction, disordered eating behaviors, low self-esteem, and depression
- Sibling relationships
  - Intimacy related to healthy attitudes and exercise behaviors
  - Conflict associated with an increased risk of overweight
    - Strongest in sibling pairs with older brothers

Senguttuvan, et al 2014

# Family Functioning Domain

- Family emotional closeness/connection
  - Associated with lower BMI, breakfast consumption, frequent family meals, & lower eating related parent-child conflict

- Family weight teasing
  - Associated with higher BMI, disordered eating, low body satisfaction, low self-esteem, high depressive symptoms, & suicide ideation

# Division of Responsibility for Feeding

- Parents take the lead on the WHAT, WHEN, AND WHERE of feeding
- Child determines how much and if they are going to eat what is provided
- Encourage and model family, structured, sit-down meals and snacks

# Osteopathic Approach

# Objective #4

Explain the relationship of Adverse Childhood Experiences to chronic disease

# Adverse Childhood Experiences

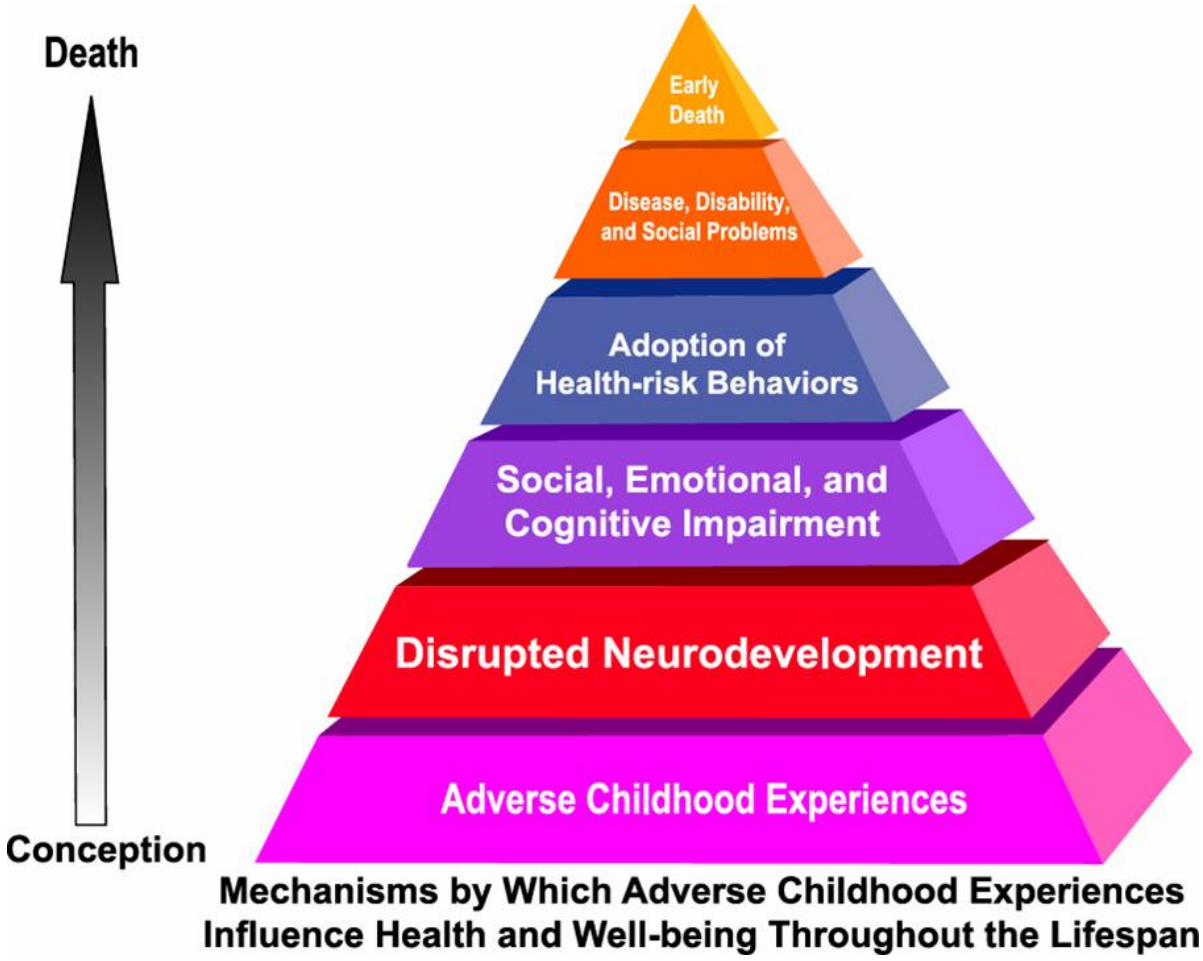
- The Adverse Childhood Experiences (ACE) Study examined the impact of abuse, neglect, exposure to intimate partner violence and other household dysfunction during childhood on adult health risk behaviors and chronic disease development.

- Over half of respondents had at least one adverse childhood experiences with over 6% having at least 4.

- The study found that “the impact of adverse childhood experiences on adult health status is strong and cumulative”

Felitti, et al 1998

# Adverse Childhood Experiences




Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

Felitti, et al 1998

# Adverse Childhood Experiences and Obesity

- Compared with an ACE score of 0, individuals with an ACE score of 4 are nearly twice as likely to be severely obese (BMI ≥ 35)
- Overeating is a means of coping
- Food has psychoactive benefits
- Obesity is protective socially, sexually, and physically

Felitti, et al 1998, Felitti, et al 2010

# Protective and Compensatory Experiences (PACEs)

| Relationships and connections | Environmental conditions and resources |
|---|---|
| Did you have someone who loved you unconditionally (you did not doubt that they cared about you)? | Did you have an engaging hobby -- an artistic or intellectual pastime either alone or in a group? |
| Did you have at least one best friend (someone you could trust, had fun with)? | Did you have an adult (not a parent) you trusted and could count on when you needed help or advice? |
| Did you do anything regularly to help others or do special projects in the community to help others? | Did you live in a home that was typically clean and safe with enough food to eat? |
| Were you regularly involved in organized sports groups or other physical activity? | Did your school provide the resources and experiences you needed to learn? |
| Were you active in at least one social or civic (non-sport) group with peers? | Were there routines and rules in your home that were clear and fairly administered? |

Morris, Hays-Grudo, et al 2015; Shonkoff, et al 2012

# Osteopathic Approach

# Summary

Consider all causes of weight gain, weight re-gain, or failed weight loss attempts

Consider obesity from an ecology prospective

Take an osteopathic approach to obesity prevention and treatment

# Resources

- University of Connecticut Rudd Center for Food Policy and Obesity "Preventing Weight Bias: Helping Without Harming in Clinical Practice" http://www.uconnruddcenter.org/
- Strategies to Overcome and Prevent (STOP) Obesity Alliance "Why Weight? A Guide to Discussing Obesity and Health With Your Patients" http://www.stopobesityalliance.org/
- National Institute of Diabetes and Digestive and Kidney Diseases "Talking with Patients about Weight Loss: Tips for Primary Care Providers" https://www.niddk.nih.gov/health-information/weight-management/talking-adult-patients-tips-primary-care-clinicians
- Obesity Action Coalition http://www.obesityaction.org/
- Project Implicit https://implicit.harvard.edu/implicit/
- Ellyn Satter Institute https://www.ellynsatterinstitute.org/

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