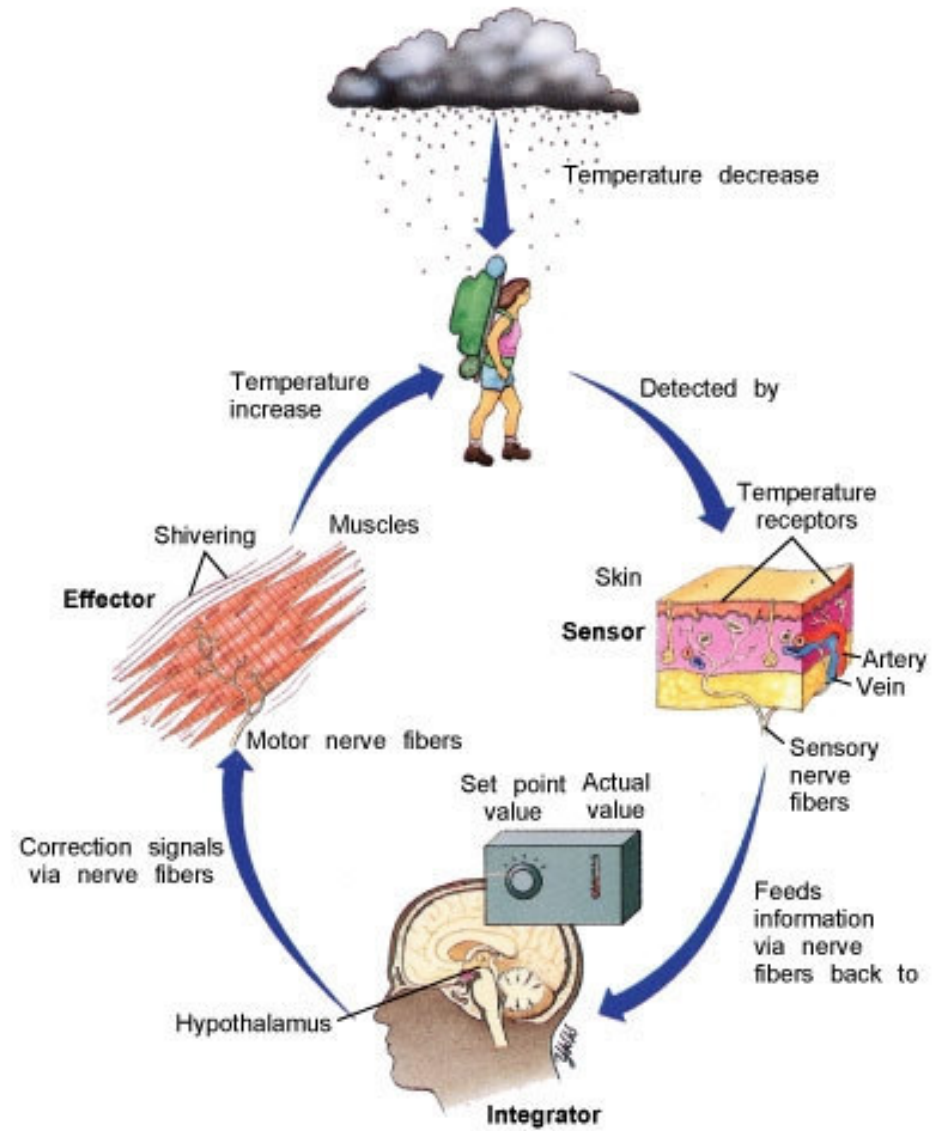
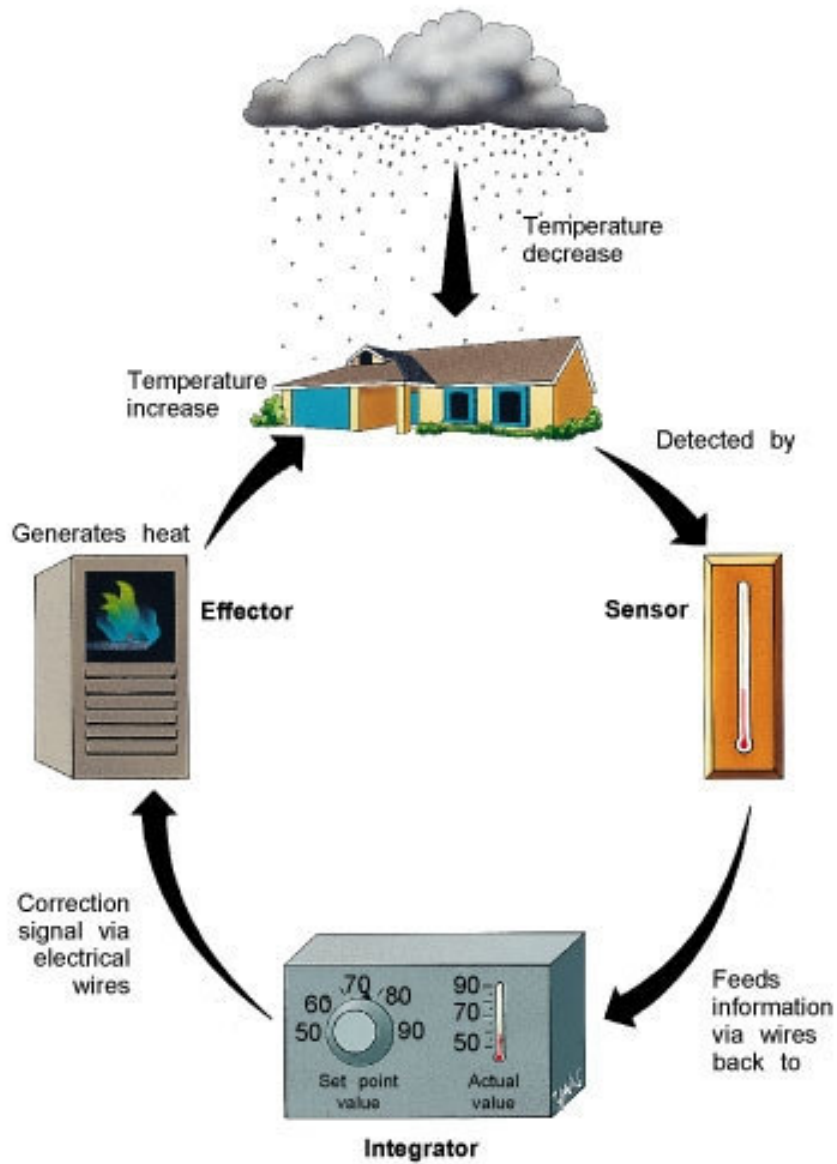


# Concepts of Homeostasis

- Homeostasis – a dynamic steady state, representing the net effect of all turnover reactions
  - Within each homeostatic system there exists a range of values under which the body functions adequately
    - Example: blood glucose levels (80 – 100 mg/ml)
- Homeostatic Control Mechanisms
  - Negative Feedback
    - Variable to be regulated
    - Sensor
    - Integrator
    - Effector
    - Change in variable



# Concepts of Homeostasis

## – Positive Feedback Mechanisms

- Delivery
- Blood clotting

## Concepts of Disease and Illness

- Disease – a disruption of homeostasis, the sum of the variations from the normal
- Factors Affecting Determination of Normality

# Concepts of Disease and Illness

- Genetic Variation (ex. A normal low blood pressure)
- Cultural Considerations
- Age Differences
  - Typically organs get smaller
  - Hair grays
  - Skin wrinkles
  - Gums recede
  - Near sight diminishes
  - Loss of high tone hearing
  - Taste less discriminatory
  - Less sweat glands/diminished thirst
  - Decreased temperature discrimination
  - Heart rate

# Concepts of Disease and Illness

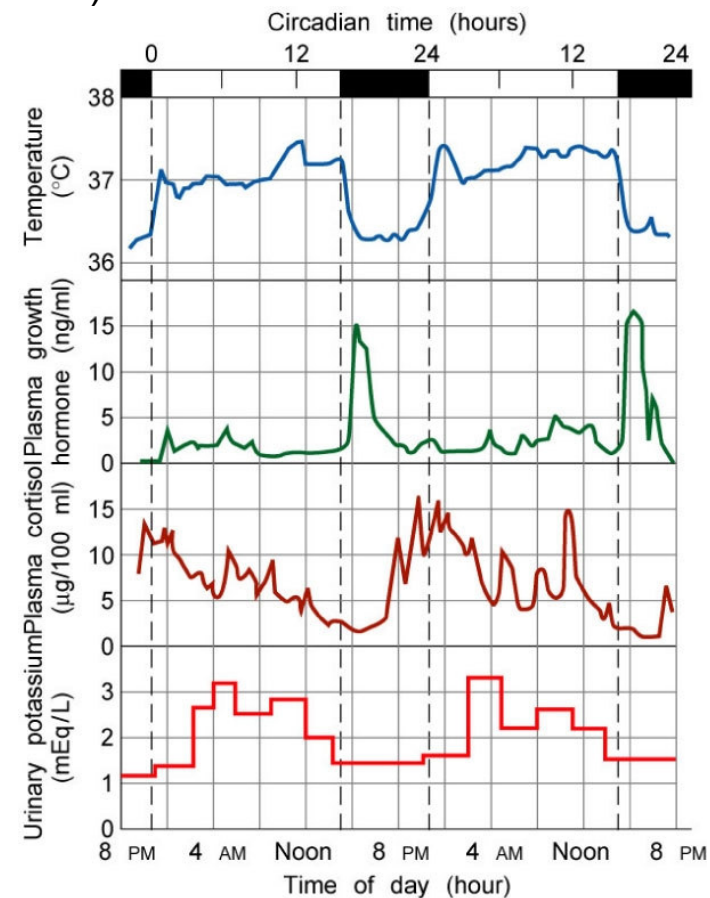
## – Gender Differences

- Levels of sex hormones
- Blood test values (which ones and what?)

## – Situational Differences

- Polycythemia

## – Time Variations – circadian rhythms



Redrawn from Vander AJ, Sherman JH, Luciano DS: Human physiology, ed 7, New York, 1998, McGraw-Hill.

## Concepts of Disease and Illness

- Laboratory Conditions – different methods and reagents can give different results
- Baseline Evaluations – importance of a healthy physical and regular examinations

## Framework for Pathophysiology

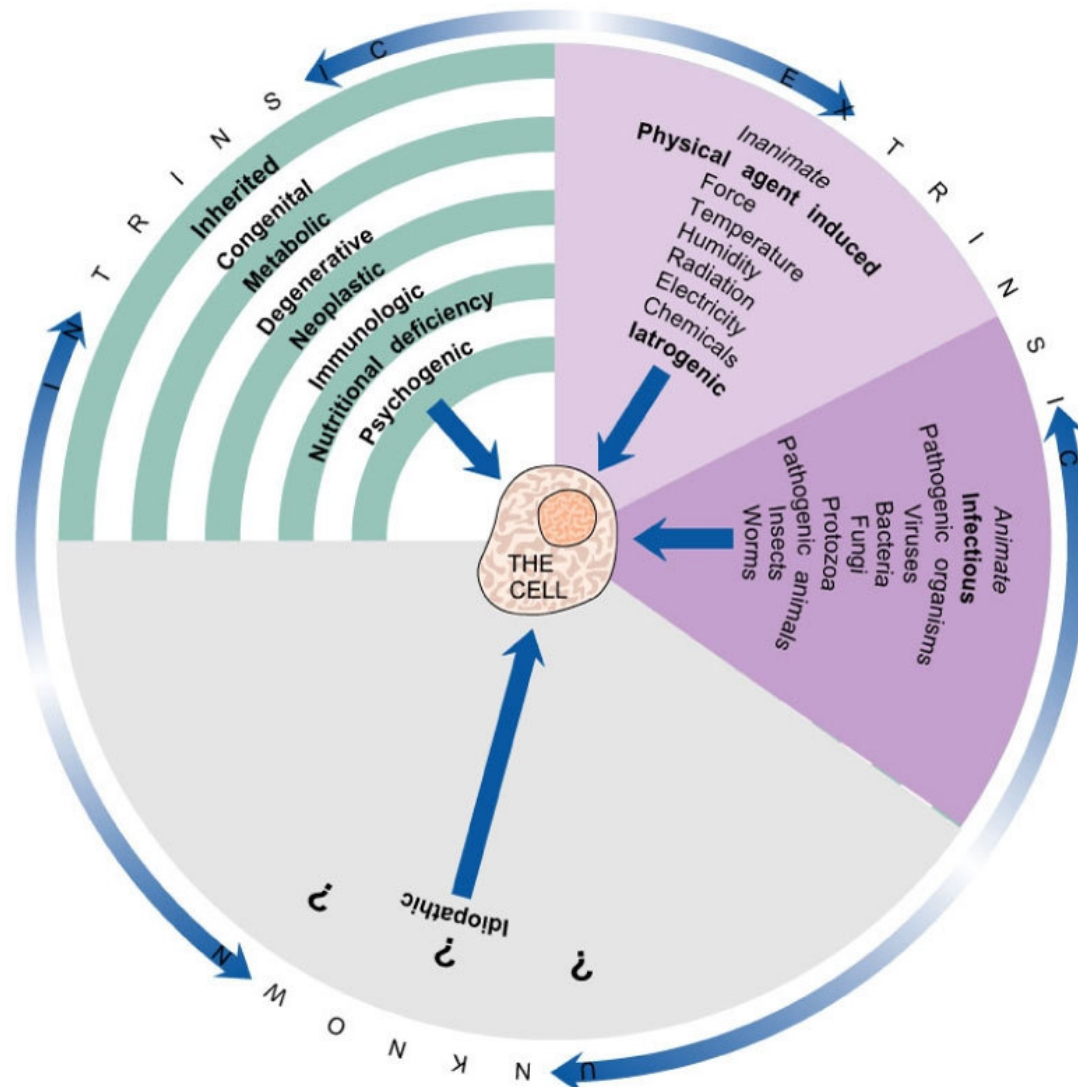
- Three aspects of a particular disease form a framework as to what is happening in an individual
  - Etiology
  - Pathogenesis
  - Clinical Manifestations

# Framework for Pathophysiology

- Etiology – the study of the causes or reasons for a disease or phenomena (ex. A particular bacterium or infectious agent)
  - Inheritance and Environment
    - Environment can cause changes by itself as can genetic makeup (ex. Barrel chest of people living at high altitudes. Why? – Down Syndrome)
    - In some instances both environmental and genetic factors interact (ex. Allergy to bee stings)
    - Implications in sickle cell anemia

# Framework for Pathophysiology

- Classification of Disease – many things can initiate disease





# Framework for Pathophysiology

- Inherited – the result of abnormal proteins being made
  - Many are lethal
  - Some require environmental triggers to turn them on
  - Metabolic Diseases - PKU
- Congenital Diseases
  - Malformation of organs during development
- Degenerative Diseases
  - Heart disease and strokes
  - Osteoarthritis
  - Emphysema of the lungs

# Framework for Pathophysiology

- Neoplastic Diseases – tumors; can be malignant or benign
  - Cancers – causes can be varied
    - » Chemicals
    - » Viruses
    - » Sunlight
    - » Irradiation
    - » chronic irritation
- Immunologic Diseases
  - Autoimmune diseases
  - Hypersensitivities
  - AIDS

# Framework for Pathophysiology

- Infectious Diseases
  - Prions (“mad cow” disease)
  - Viruses
  - Bacteria
  - Fungi
  - Protozoa
  - Pathogenic animals
- Physical Agent-Induced Diseases
  - Destructive chemicals
  - Violent injury
  - Chemicals
  - Hernia
  - Gall and kidney stones

# Framework for Pathophysiology

- Nutritional Deficiency Diseases
- Iatrogenic Diseases – caused by physicians or health professionals “medical errors”
  - \$29 billion/year
  - 44,000 – 98,000 deaths annually (lower value 8<sup>th</sup> leading cause of death)
- Psychogenic Diseases – emotional or mental causes
  - Some ulcers
  - Spastic colon
- Idiopathic Diseases – unknown causes
  - Idiopathic hypertension

# Framework for Pathophysiology

- Pathogenesis – development or evolution of a disease; example a *Staph* infection

Invasion of body by organism

Manifestation of the infection

– Factors Affecting Pathogenesis

- Time
- Quantity
- Location
- Morphologic Changes

# Framework for Pathophysiology

- Clinical Manifestations
  - Signs and Symptoms
    - Symptoms – subjective feelings
    - Signs – manifestations of the disease
    - Syndrome – a collection of different signs and symptoms
    - Lesion – a structural change (can be gross or microscopic)
  - Stages
    - Latent period
    - Prodrome or prodromal period – first signs and symptoms
    - Stage of manifest illness or acute phase
    - Subclinical stage – disease is progressing but no clinical signs or symptoms (kidney disease)
    - Exacerbation – sudden increase in the signs and symptoms
    - Remission – decline in the severity of the signs and symptoms (if permanent then cured)
    - Convalescence – stage of recovery
    - Sequela – a condition the result of a disease
    - Complication – a new problem the result of the original

# Framework for Pathophysiology

## – Acute or Chronic Disease

- Acute – severe manifestations but usually short lived
- Chronic – condition persists for a long time
- Intercurrent Disease – when a disease occurs during the course of another

## Concepts of Epidemiology

Epidemiology is the patterns of disease within populations

Epidemics – disease spreads to many individuals at the same time

Pandemic – epidemics that affect large geographical areas

# Concepts of Epidemiology

- Factors Affecting Patterns of Disease
  - Age – related terminology
    - Prenatal
    - Childhood
      - Certain accidents
      - Childhood diseases
    - Developmental processes – occur early years of life
    - Aging Processes – occur later in life (gerontology)



# Concepts of Epidemiology

- Ethnic Group – very closely related to socioeconomic, religion, customs, and geographic factors
  
- Gender
  - Particular gender specific diseases
  - Urinary tract infections in young women
  - Delayed progression of vascular diseases in women (Why?)
  
- Socioeconomic Factors and Lifestyle Considerations
  - Poverty
  - Occupations
  - Cultures – smoking, diet, and lack of exercise
  - Access to health care

# Concepts of Epidemiology

- Geographic Location
  - Climate related problems
    - Insects
    - Fungal infections
    - Frostbite, heat related problems
    - Altitude

## Implications for Treatment

- Levels of Prevention
  - Primary Prevention
    - Vaccinations
    - Better housing, nutrition, access to health care, sanitation
    - Education

# Implications for Treatment

- Secondary Prevention
  - Regular “check ups” and exams
    - Mammograms
    - PAP smears
    - Blood pressure
    - Colonoscopy
    - Prostate exams (digital and PSA)
    - Amniocentesis
- Tertiary Prevention - treatment