

## **Chapter 12:**

The health of the body depends on the health of its interdependent systems.

# How Body Systems are Connected

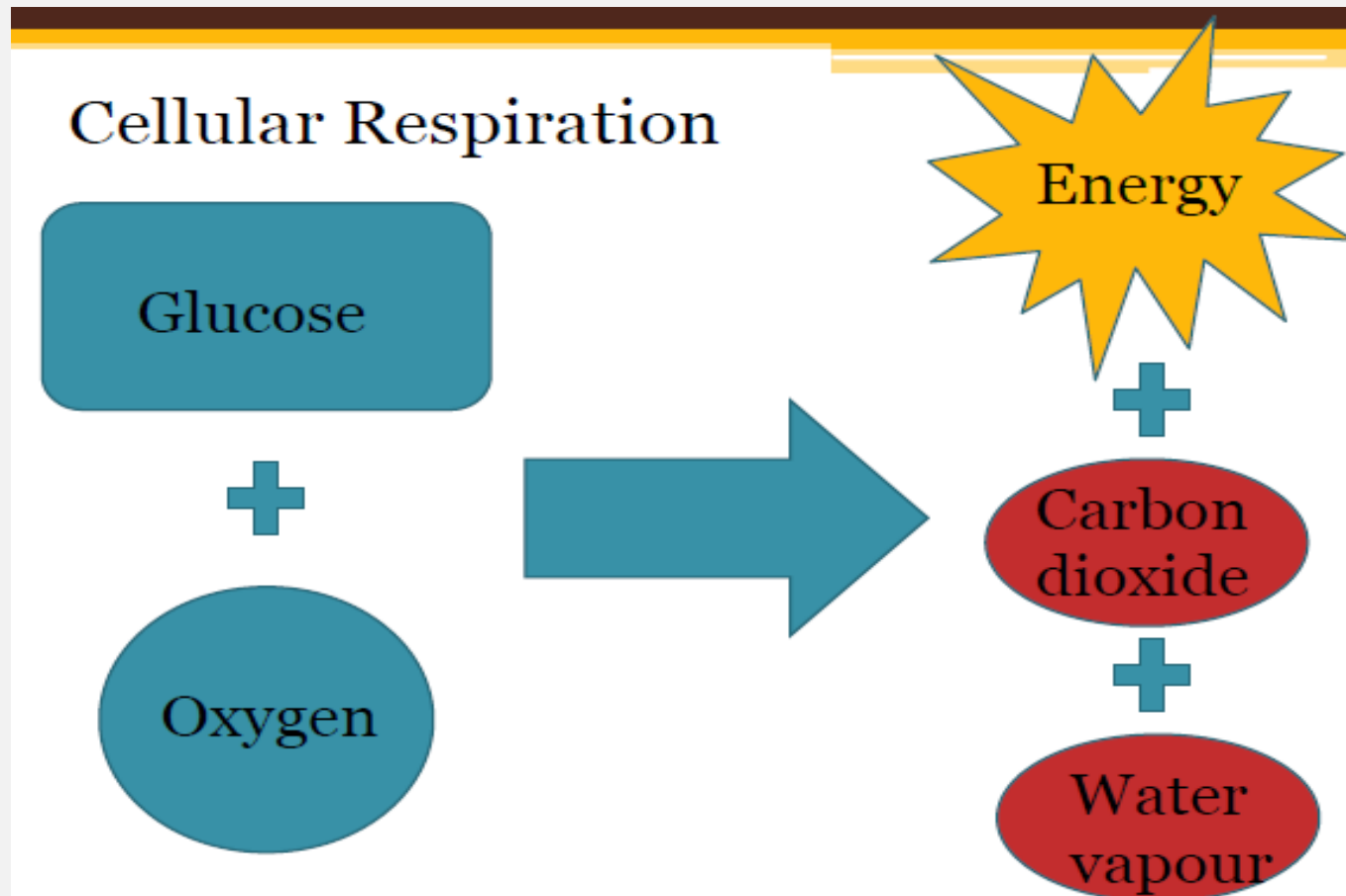
All the cells of the body have the same basic needs:

1. Energy
2. Nutrients
3. Oxygen
4. Removal of wastes

*Body systems work together to provide cells with what they need.*

# Example: Cellular Respiration

A chemical process that releases energy that is stored in glucose.



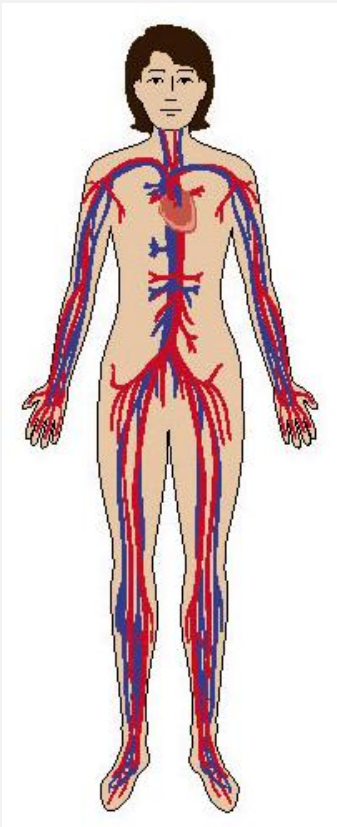
Organ systems that are directly involved with cellular respiration include:

- Respiratory system
- Digestive system
- Circulatory system
- Excretory system

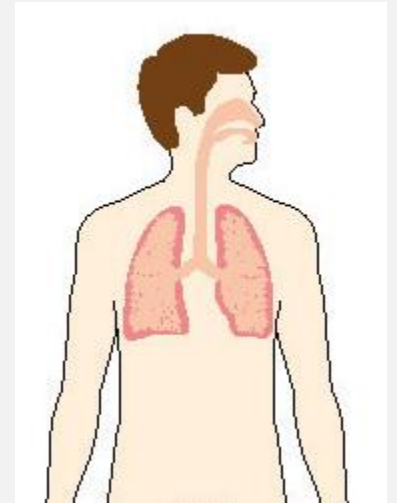
# Connections Between Systems:

1. Circulatory & Respiratory
2. Circulatory & Digestive
3. Nervous & Muscular

# 1. Circulatory & Respiratory

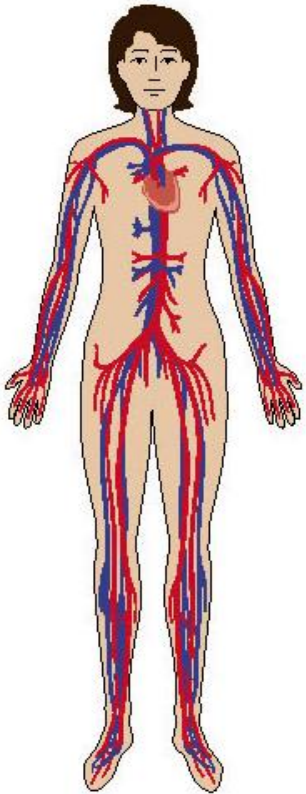


- The blood picks up oxygen from the lungs and delivers it to the body cells.

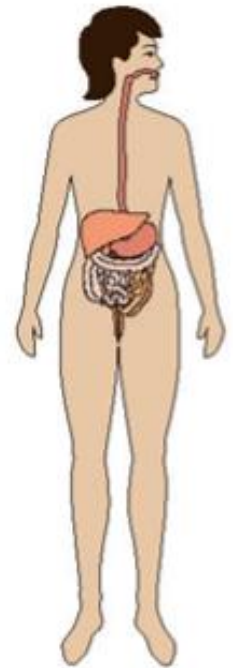


- The blood picks up carbon dioxide and delivers it to the lungs to be exhaled.

## 2. Circulatory & Digestive



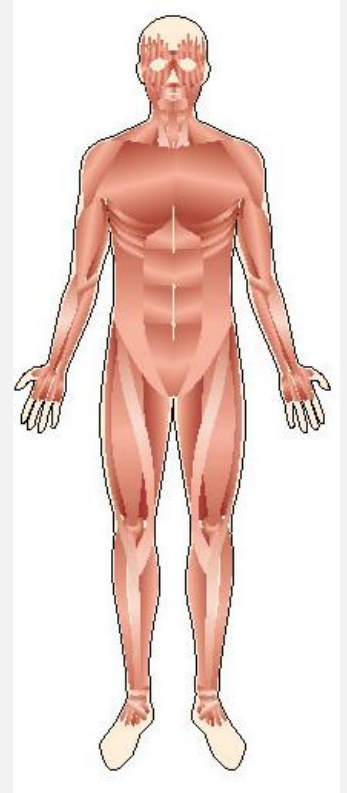
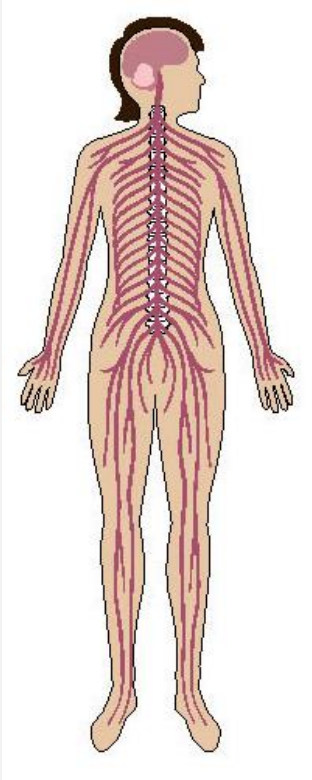
- The digestive system breaks down food into glucose and other nutrients.
- Nutrients enter the blood from the small intestine.
- The blood carries the nutrients to the body cells.





# 3. Nervous & Muscular

- Helps keep your body temperature stable.
- The nervous system monitors conditions outside the body through temperature-sensing cells in the skin.
- The information that is sent to the brain causes the brain to send nerve signals to different parts of the body, including the muscles.
- Ex. If cold, the muscles will relax and contract rapidly i.e. Shiver.



# Textbook Questions

**Page 445:**

**#s 1-7 and Pause & Reflect**

# Body Systems & Health

- Maintaining the health of each body system keeps the network of systems, and the whole body healthy.
- Factors that affect system health include:

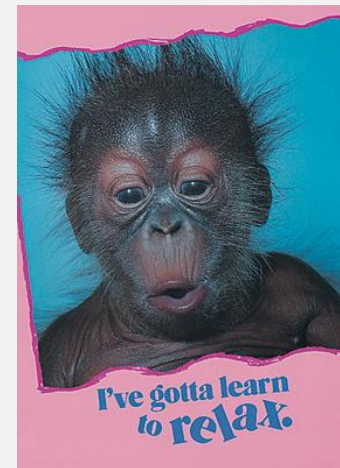
1. Diet



2. Exercise



3. Stress



# The Balance of Body Systems

Can be affected  
by both:

- Genetic factors
- Lifestyle factors



# Genetic Factors

- Out of your control
- Things you inherit from one or both birth parents.



# Lifestyle Factors (*page 449*)

- Within your control

Include:



- Diet
- Smoking



- Drugs and alcohol
- Lack of exercise



# 1) Diets that are high in fats and cholesterol

- Fats are harder to digest than other nutrients.
- Fatty deposits clog blood vessels.
- Fatty deposits in the arteries make your heart work harder.
- Cholesterol can crystallize in the gall bladder to form gallstones.

## **2) Overweight/Obesity**

**(20% above their desirable weight):**

- Added weight strains heart functions, increased risk of heart disease.
- Associated with high cholesterol, high blood pressure, or diabetes.



### **3) Lack of Exercise:**

- Digested food stays in the large intestine too long; coating of feces on walls of the large intestine results in poor absorption of water and nutrients.
- Constricts blood vessels.
- Increased risk of heart disease.
- Risk of becoming overweight.
- Increased risk of joint disorders, such as arthritis.
- Poor digestion leading to constipation

## 4) Smoking:

- Causes an increase in blood pressure, making your heart work harder.
- Decreases the amount of oxygen for body cells.
- Doubles the risk of sudden heart attack and death.
- Can cause indigestion.
- Linked to respiratory problems and lung cancer.



**NON SMOKER**



**SMOKER**

### Healthy Lungs

In healthy people who live in a clean environment, the lungs are light pink

- A BREATH OF FRESH AIR
- KEEP THEM HEALTHY!



### Smoker's Lungs

In smokers, the lungs appear dark and mottled owing accumulation of inhaled tar and impurities from cigarettes.

- SMOKING DAMAGE
- SMOKE AND THE LUNGS
- CANCER FACTS
- NEED HELP QUITTING SMOKING?



slide

### Breath of Fresh Air

The average human inhales 388 cubic feet of air a day, enough to fill the total volume of 3 mid-sized sedans. About 19 cubic feet of that is pure oxygen, or enough to fill one sedan's trunk. A smoker's lungs have a reduced capacity to absorb oxygen, so the person may not get the oxygen they need.

Slide the above tabs on either side to see a comparison.



Advertisement

# STOP SMOKING START REPAIRING

**In 1 week**  
your sense of taste and smell improves

**In 1 month**  
skin appearance is likely to improve

**In 5 days**  
most nicotine is out of your body

**In 3 months**  
your lung function begins to improve

**In 8 hours**  
excess carbon monoxide is out of your blood

**In 12 months**  
your risk of heart disease has halved

**Today**  
quit before getting pregnant and your risk of having a pre-term baby is reduced to that of a non-smoker

**In 1 year**  
a pack-a-day smoker will save over \$4,000

**EVERY CIGARETTE YOU DON'T SMOKE IS DOING YOU GOOD**

Quitline.13 7848  
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# STOP SMOKING START REPAIRING

**In 1 week**  
your sense of taste and smell improves

**In 5 years**  
your risk of a stroke has dramatically decreased

**In 12 weeks**  
your lungs regain the ability to clean themselves

**In 12 months**  
your risk of heart disease has halved

**In 8 hours**  
excess carbon monoxide is out of your blood

**In 5 days**  
most nicotine is out of your body

**In 3 months**  
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# It is Never TOO Late to Stop!

## The Healing Time Line

A realistic look at how long it takes for your body to recover after your last puff



● Twenty minutes after quitting, your blood pressure decreases.

● Eight hours: The amount of carbon monoxide in your blood drops back to normal while oxygen increases to normal.

● Forty-eight hours: Your nerve endings start to regenerate, and you can smell and taste things better.

● One to nine months: Coughing, sinus congestion, fatigue, and shortness of breath decrease.

● One year: The added risk of heart disease declines to half of that of a smoker.

● Five years: Your stroke risk may be reduced to that of someone who never smoked.

● Ten years: Your risk of all smoking-related cancers such as lung, mouth, and throat decreases by up to 50 percent.

● Fifteen years: Your risk of heart disease and smoking-related death is now similar to that of someone who never smoked.

# 5) Drugs and Alcohol

## Stimulants

- Temporarily increases rate of life functions.
- Speeds up heart rate.
- May cause diarrhea, stomach pain, changes in sleep patterns, anxiety, loss of appetite, vomiting.
- Can lead to dehydration, which can lead to constipation.

## Depressants

- Decrease rate of life functions.
- Slow down heart rate.
- May cause nausea, increased acid production, vomiting, and diarrhea or constipation (depending on other factors such as if the person is dehydrated or not, or if the person is taking other drugs or has pre-existing medical conditions).

# 6) Stress

## Nervous System

- The body suddenly shifts its energy resources to fighting off the perceived threat.
- Adrenal glands release adrenaline and cortisol.
- Fast heart beat, raised blood pressure, digestive issues.

## Musculoskeletal system

- Tense muscles
- Tension headaches



## **Respiratory System**

- Breathe harder/rapid breathing
- Hyperventilation
- Panic attacks

## **Cardiovascular System**

- Inflammation in the coronary arteries, thought to lead to heart attack.

## **Endocrine System**

- Liver produces more glucose, a blood sugar that would give you the energy for “fight or flight” in an emergency.

# Gastrointestinal System

- Eat more/less
- Heartburn or acid reflux
- Nausea or pain
- Vomiting
- Can affect digestion and which nutrients your intestines absorb.
- Diarrhea or constipation.

# For healthy organs & body systems, we all have the same basic needs:



- Clean air and water
- A nutritious and well-balanced diet



- Exercise
- Restful sleep

# Scientific Technologies

1. Insulin pump: a device that can be programmed to deliver a specific dose of insulin at specific times during the day. Worn at all times (Diabetes) – used to help out the pancreas



**2. Artificial Heart:** used when a donor heart is unavailable. It is difficult for humans to stay alive for any length of time using hearts from other species.



Artificial Hearts



STSE: Artificial  
Organs

# Examples of Careers in Health

- Lab technician
- X-ray technician
- Physiotherapist
- Nutritionist
- Coaches
- Doctor
- Public health nurse



# Making Informed Decisions:

## *Ideas for research...*

- Insurance companies
- Fitness equipment
- Use of sunscreen
- Food additives
- Steroids
- Other?

# Textbook Questions

**Page 457:**

#s 1-9



Core Lab Activity 12-1B  
Page 442-3

“The Effect of Activity on  
Heart Rate and  
Breathing Rate”