

**DIETARY GUIDELINES
SODIUM & POTASSIUM
TOO MUCH & TOO LITTLE**

SODIUM & POTASSIUM: WHAT THEY DO

- Minerals
- **Potassium**: keeps heart rhythm normal
- **Sodium & potassium**:
 - Control blood acidity
 - Control- amount H₂O in body
 - Important- **nerve impulses & muscle contraction**

TOO MUCH SALT (SODIUM)

- ↑ Blood pressure
- ↑ Heart attack (#1 killer)
- ↑ Stroke (#3 killer)
- ↑ Heart failure
- ↑ Kidney Disease

Know these numbers

Systolic/Diastolic

Normal

120/80

Pre-hypertension

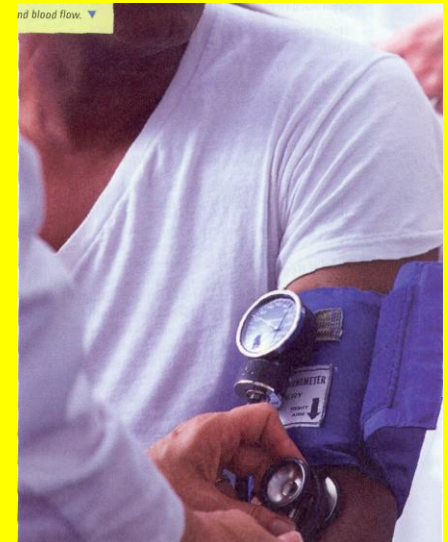
121-139/81-89

Hypertension

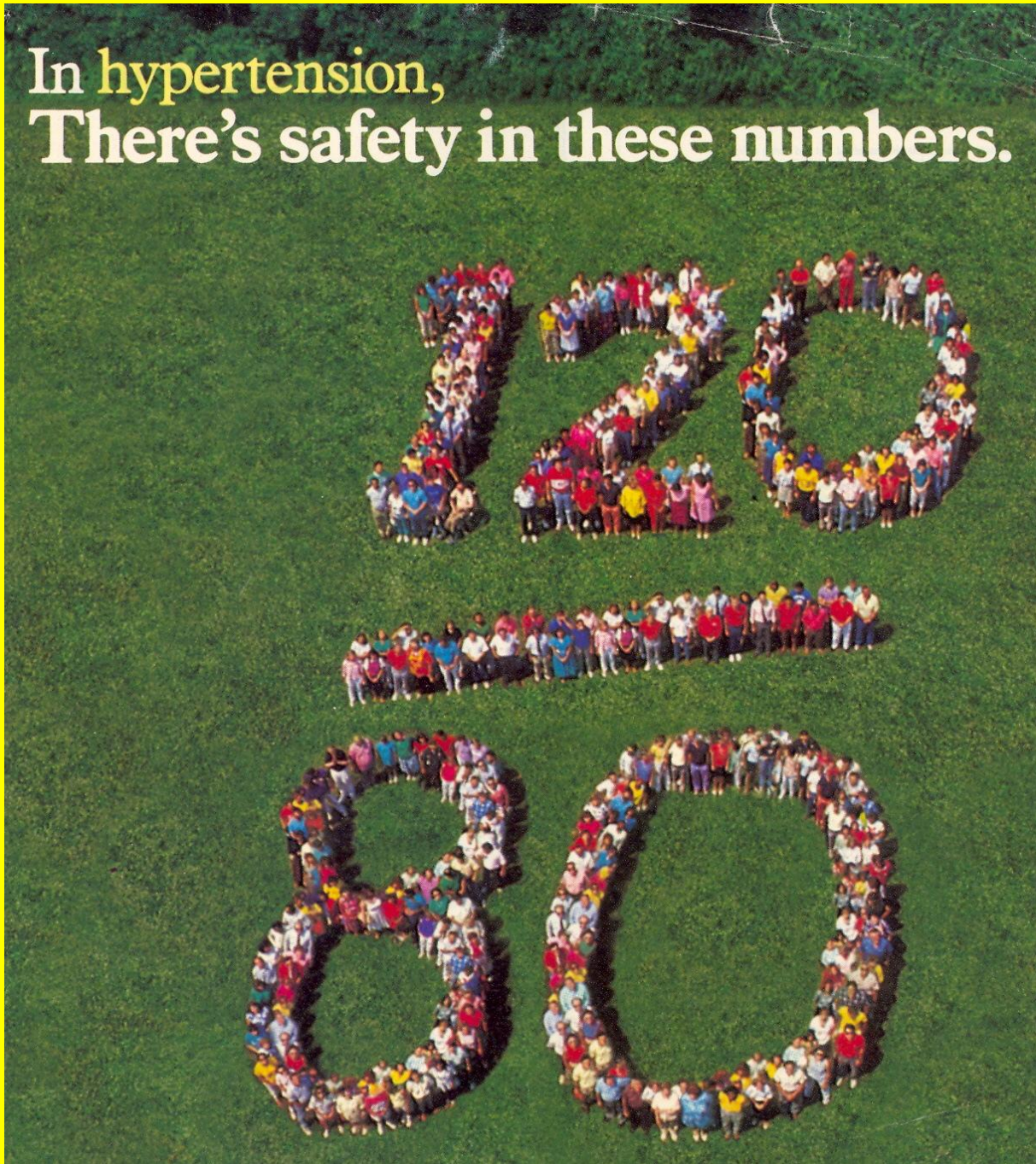
140/90 or **>**

Systolic: heart pumping

Diastolic: heart relaxing



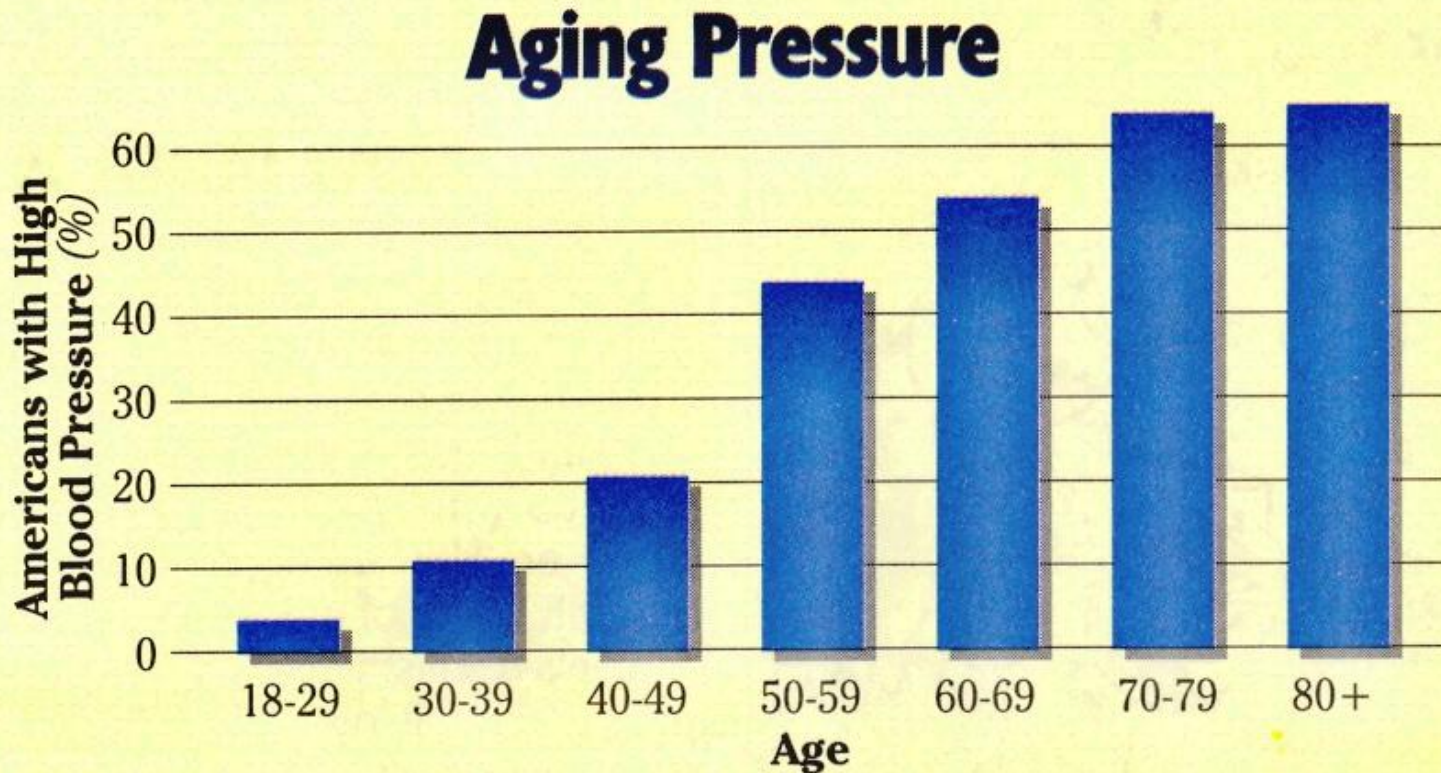
In hypertension,
There's safety in these numbers.



High Blood Pressure= Hypertension

- 50 million Americans
- **“silent killer”**
- 90% adults: hypertension with **age**
- ↑ Children/teens
- ↑ Black Americans
- Obesity, Fast foods, No exercise
- ↑ Alcohol
- ↑ Sleep Apnea (breathing pause)

Blood Pressure & Age



If you don't have high blood pressure now, don't assume you never will. The risk goes up sharply as you age.

Source: *Archives of Internal Medicine* 153: 186, 1993.

Rigid vessel wall

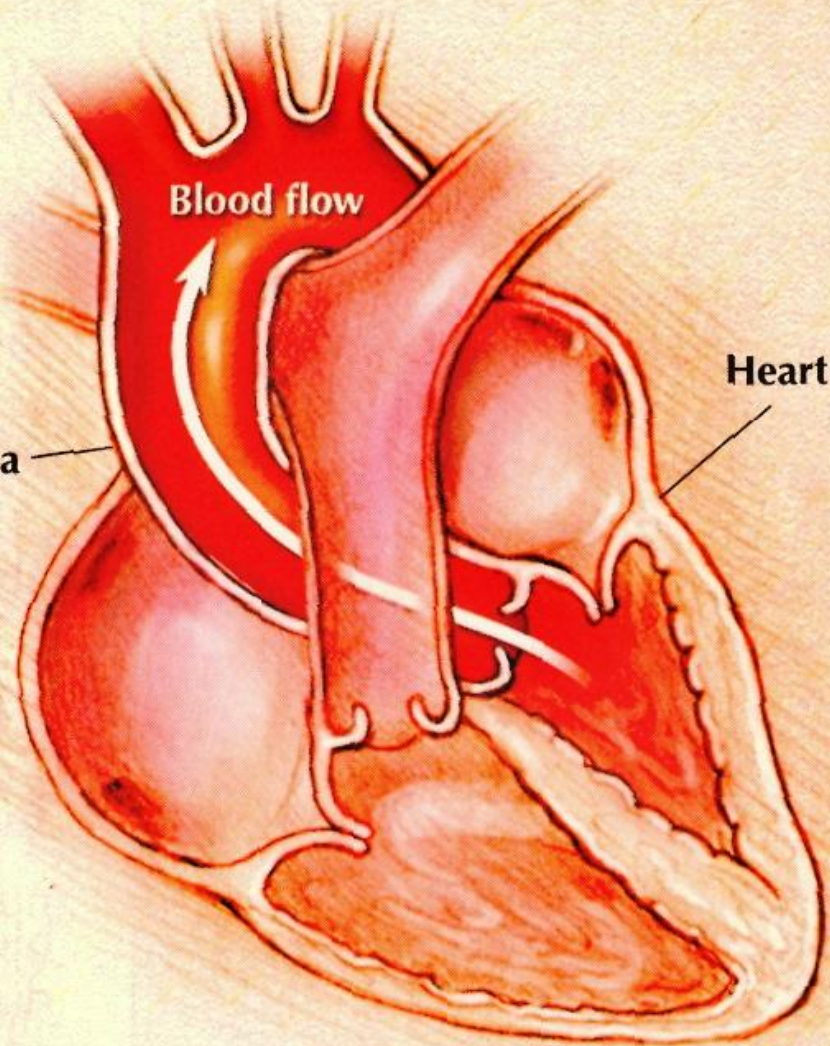


Plaques

Aorta

Blood flow

Heart



As arteries near your heart become more rigid and less able to expand, more force from each heartbeat is passed along to the rest of your blood vessels. This can raise your systolic blood pressure.

Sodium in diet: what you need

- Adequate intake: **1500** milligrams/day (New Guidelines)
- Above **1500**: not needed- unless: strenuous work/exercise



Milligrams of Sodium

3,500
3,000
2,500
2,000
1,500
1,000
500
0



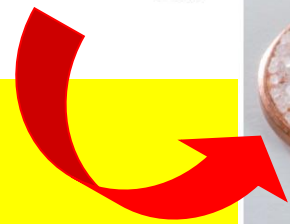
**American adult
daily consumption
(>3,400 mg)**

**Adult upper level
(2,300 mg)**

**Adult
recommended
daily (1,500 mg)**

**Adult needed
daily (180 mg)**

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Where does sodium come from?

12%: naturally- foods

11%: you- salt shaker

77%: **processed foods-**
added by
companies

Salt in supermarket foods

mg sodium

Breads	95-210
Frozen pizza	450-1200
Frozen veggies	2-160
Salad dressing	110-505
Salsa	150-240
Tomato soup	700-1260

Salt in supermarket foods

mg sodium

Tomato juice	340-1040
Potato chips	120-180
Tortilla chips	105-160
Pretzels	290-560

Soup Wars: Theory- ↓ Economy: attack your opponents harder. Aggressive ADS: attacking competitor by name

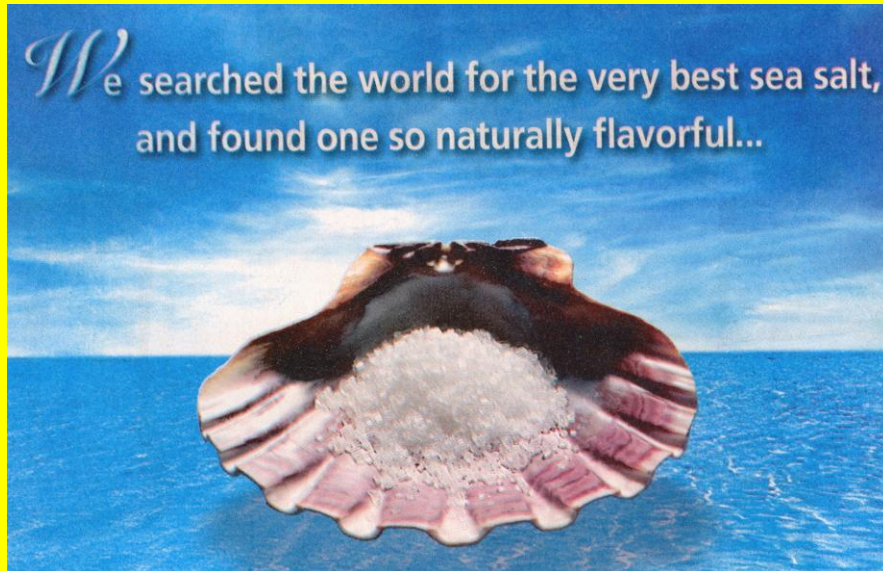
690 mg
Sodium



480 mg
Sodium



Campbell & Sea Salt



Campbell's Tomato Soup: **410-480**
mg Sodium



DIRECTIONS:
DO NOT ADD WATER

MICROWAVE: HEAT, COVERED, IN MICROWAVABLE BOWL ON HIGH 1 1/2 MIN. CAREFUL, LEAVE IN MICROWAVE 1 MIN., THEN STIR.

STOVE: HEAT, STIRRING OCCASIONALLY.

RECOMMEND USE BY DATE ON CAN END.
CAUTION: METAL EDGES ARE SHARP.
PROMPTLY REFRIGERATE UNUSED SOUP IN SEPARATE CONTAINER.

Nutrition Facts		Amount/serving	%DV*	Amount/serving	%DV*
Total Fat		4.5g	7%	Total Carb.	14g 5%
Serv. Size 1 container		Sat. Fat 1.5g	8%	Fiber 2g	8%
Calories 130		Trans Fat 0g		Sugars 3g	
Fat Cal. 40		Cholest. 25mg	8%	Protein 9g	
		Sodium 120mg	5%		
*Percent Daily Values (DV) are based on a 2,000 calorie diet.					
Vitamin A 25% • Vitamin C 0% • Calcium 2% • Iron 4%					

Satisfaction guaranteed. If you have questions or comments, please call 1-800-257-8443. Please have code and date information from the can end available.

Visit our website at www.campbellsoup.com

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WHERE FACILITIES AVAILABLE



QUICK & EASY DIRECTIONS
MIX SOUP + 1 CAN WATER

MICROWAVE: HEAT, COVERED, IN MICROWAVABLE BOWL ON HIGH 2 1/2 TO 3 MINUTES. CAREFUL, LEAVE IN MICROWAVE 1 MINUTE, THEN STIR.

STOVE: HEAT, STIRRING OCCASIONALLY.

CAUTION: METAL EDGES ARE SHARP.
RECOMMEND USE BY DATE ON CAN END.
PROMPTLY REFRIGERATE ANY UNUSED SOUP IN SEPARATE CONTAINER.

Nutrition Facts		Amount/serving	%DV*	Amount/serving	%DV*
Total Fat		2g	3%	Sodium 450mg	19%
Serv. Size 1/2 cup (120mL) condensed soup		Sat. Fat 0.5g	3%	Potassium 240mg	7%
Servings about 2.5		Trans Fat 0g		Total Carb. 8g	3%
Calories 60		Polyunsat. Fat 0.5g		Fiber 1g	4%
Fat Cal. 20		Monounsat. Fat 0.5g		Sugars 1g	
		Cholest. 10mg	3%	Protein 3g	
*Percent Daily Values (DV) are based on a 2,000 calorie diet.					
Vitamin A 15% • Vitamin C 0% • Calcium 0% • Iron 0%					

Satisfaction guaranteed. For questions or comments, please call 1-800-257-8443. Please have code and date information on can end available.

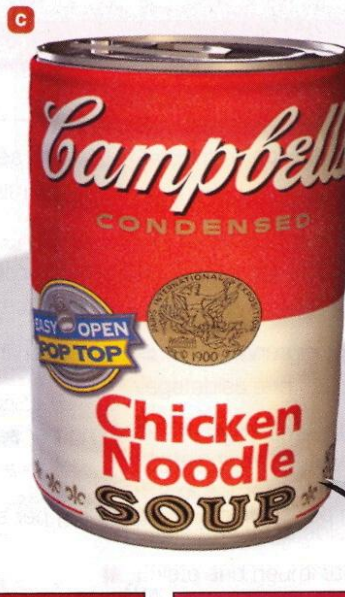
*This product contains 450 mg of sodium versus 890 mg for our comparable condensed soup. 5897-505-2X

0 51000 05897 3

American Heart Association
Meets American Heart Association food criteria for saturated fat and cholesterol for healthy people over age 2.

While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.

WHERE FACILITIES AVAILABLE



QUICK & EASY DIRECTIONS
MIX SOUP + 1 CAN WATER

MICROWAVE: HEAT, COVERED, IN MICROWAVABLE BOWL ON HIGH ABOUT 3 MIN. CAREFUL, LEAVE IN MICROWAVE 1 MIN., THEN STIR.

STOVE: HEAT, STIRRING OCCASIONALLY.

PROMPTLY REFRIGERATE ANY UNUSED PORTION IN SEPARATE CONTAINER.
RECOMMEND USE BY DATE ON CAN END.
STORE UNOPENED CAN AT ROOM TEMPERATURE.

Nutrition Facts		Amount/serving	%DV*	Amount/serving	%DV*
Total Fat		1.5g	2%	Total Carb. 8g	3%
Serv. Size 1/2 cup (120mL) condensed soup		Sat. Fat 0.5g	3%	Fiber Less than 1g	4%
Servings about 2.5		Trans Fat 0g		Sugars 1g	
Calories 60		Cholest. 15mg	5%	Protein 3g	
Fat Cal. 15		Sodium 890mg	37%		
*Percent Daily Values (DV) are based on a 2,000 calorie diet.					
Vitamin A 4% • Vitamin C 0% • Calcium 0% • Iron 2%					

Satisfaction guaranteed. For questions or comments, please call 1-800-257-8443. Please have code and date information on can end available.

For more information, visit www.campbellsoup.com

1251-406-12

0 51000 01251 7

WHERE FACILITIES AVAILABLE

2005 Dietary Guidelines: **2300**
milligrams/day

Special Populations:

1500 milligrams/day

- People with hypertension
- At risk: Black Americans, middle-aged/older adults
- **Salt-sensitive people**
- **Now for all Americans**

Potassium & Blood Pressure

Potassium: **Anti-salt**

- ↓ Blood pressure
- ↓ Risk- stroke
- ↓ Kidney stones
- ↓ Bone loss



Kidney stone

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Recommendation: **4,700** mg/day

Average American: 1/2 this amount

↑ Kidney stones US children (2008)

Oxalates (food)
binds to
calcium → stone

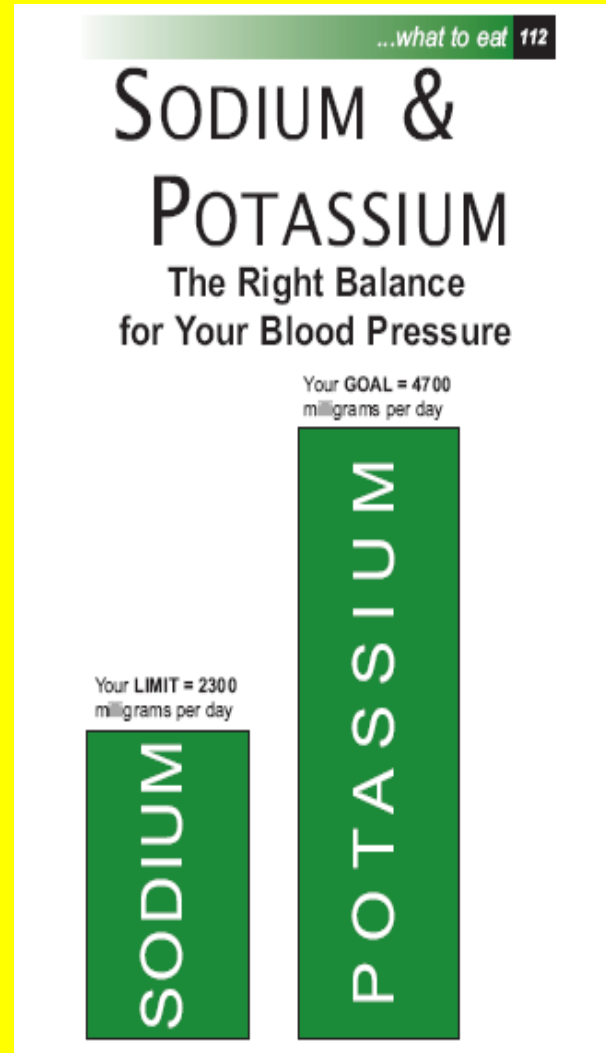
2 risk factors:

- 1) not enough drinking of fluids
- 2) too much **salt**



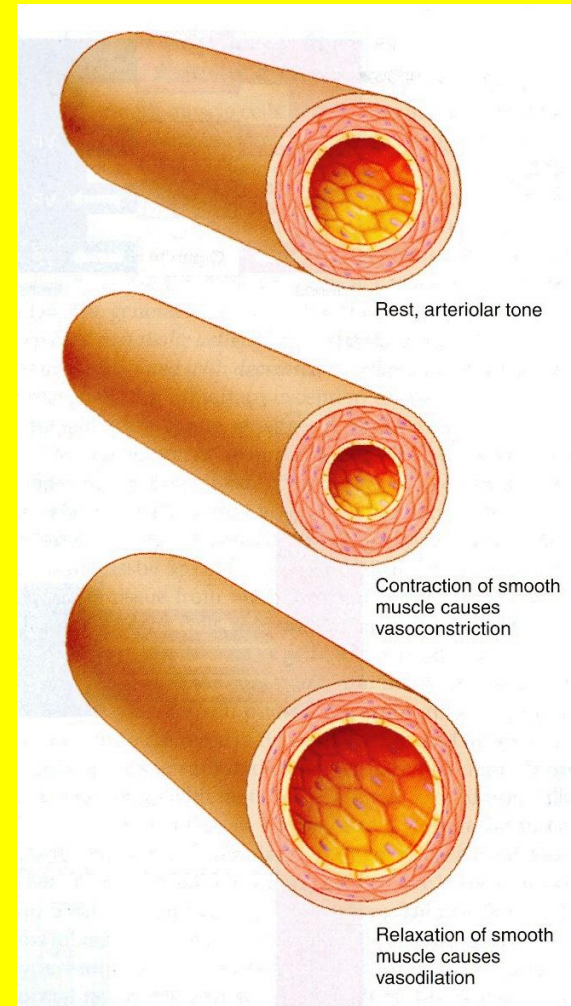
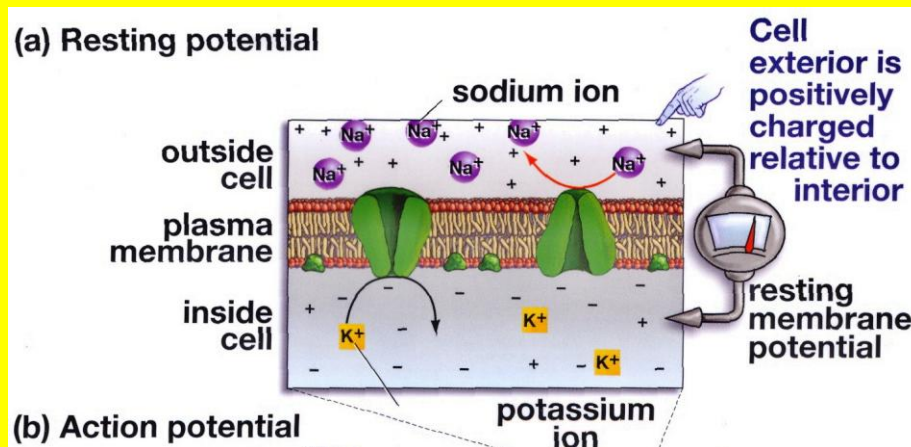
Tessa Cesario
11 years old

What's important: **balance** of sodium & potassium in diet



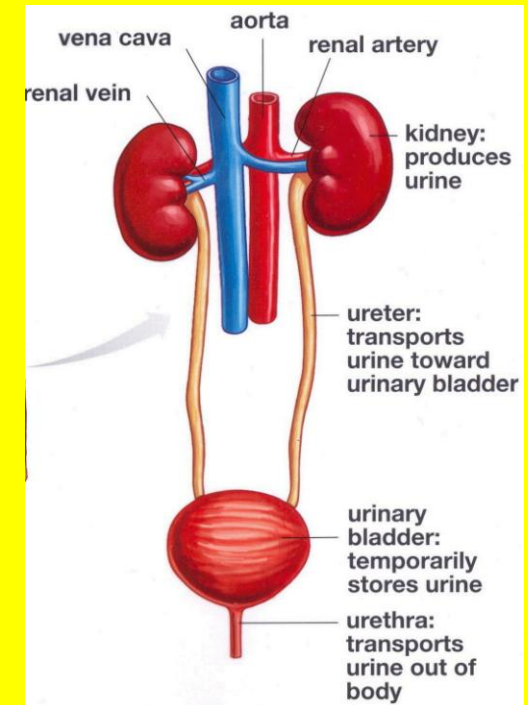
How sodium/potassium imbalance produces hypertension

1. Arteries: direct effect:
“vascular resistance”
contracted not relaxed



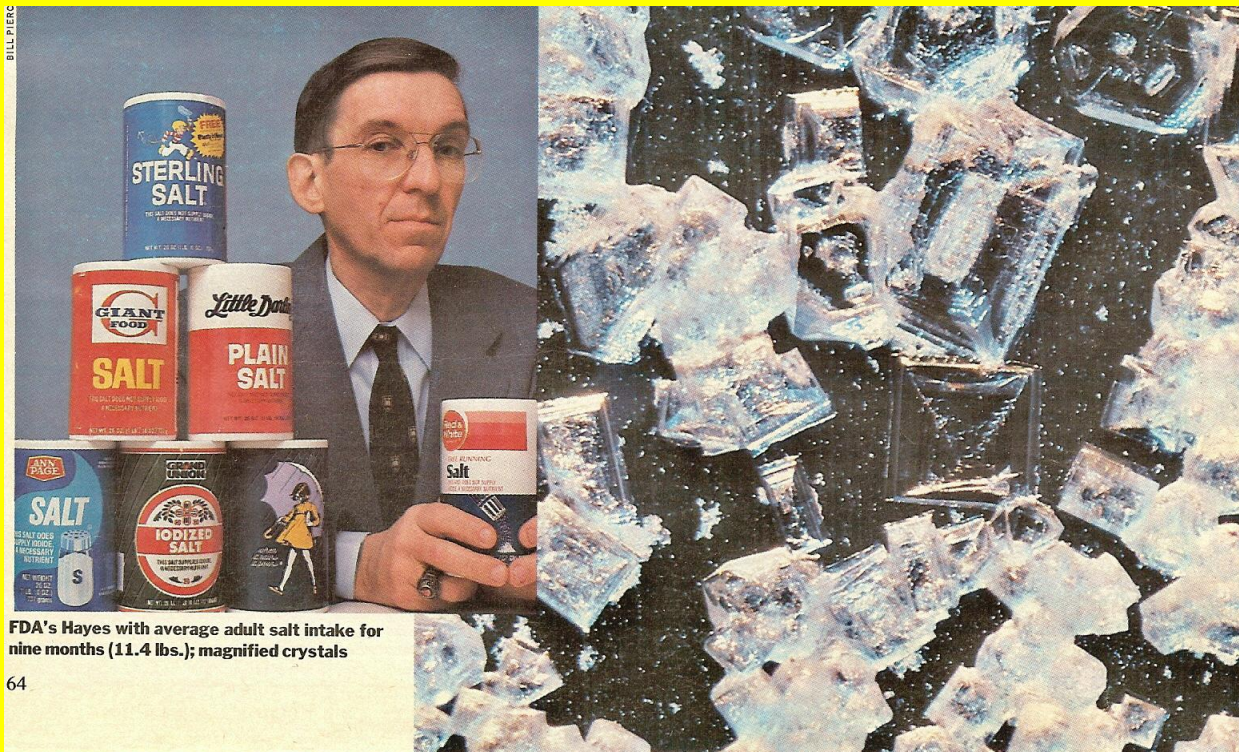
2. Effect on **kidneys**

- Our kidneys evolved: **conserve sodium & excrete potassium** (homeostasis)
- Prehistoric diet



Today's diet: **overloads** kidney's with salt (sodium)

Our kidney's have not adapted to "modern" diet



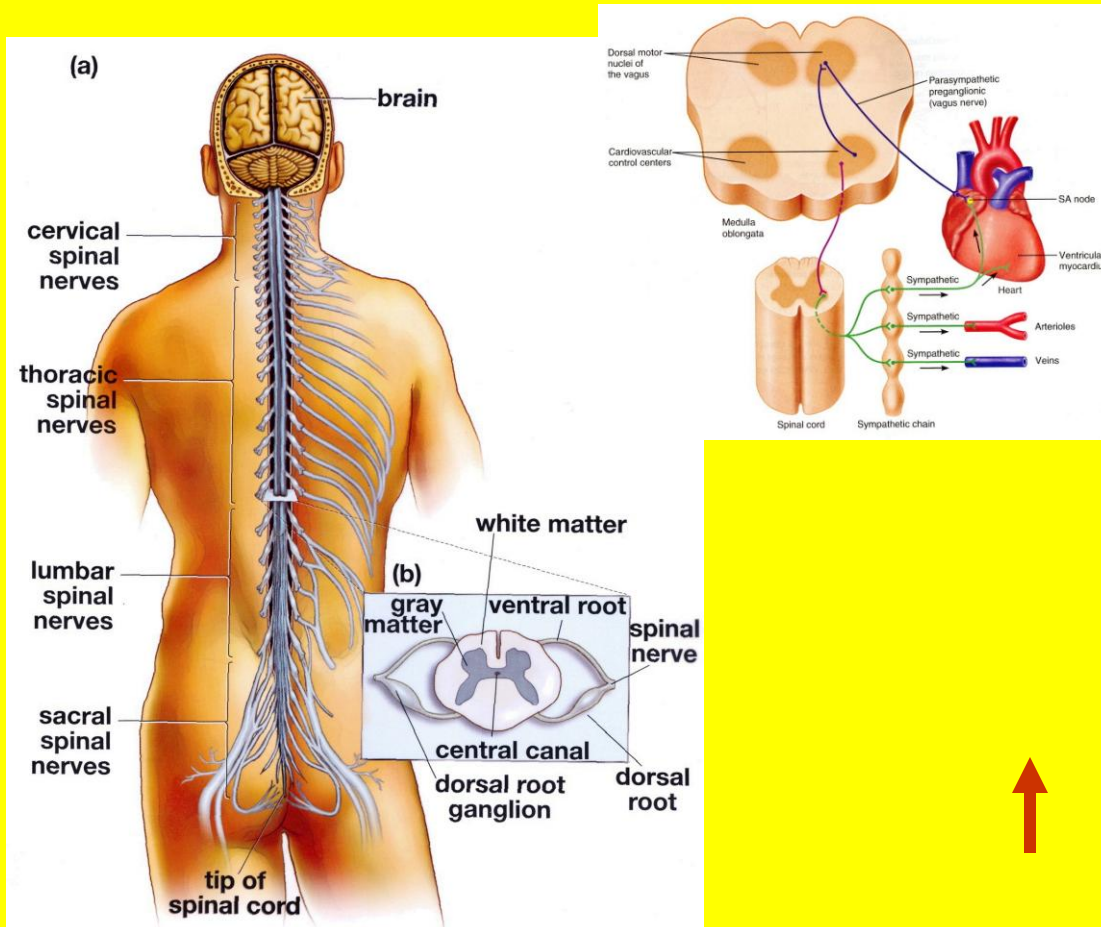
FDA's Hayes with average adult salt intake for nine months (11.4 lbs.); magnified crystals

3. Sodium/potassium in cerebrospinal fluid: affects brain → impulses

↓
blood vessels

↓
vasoconstriction

↑ blood pressure



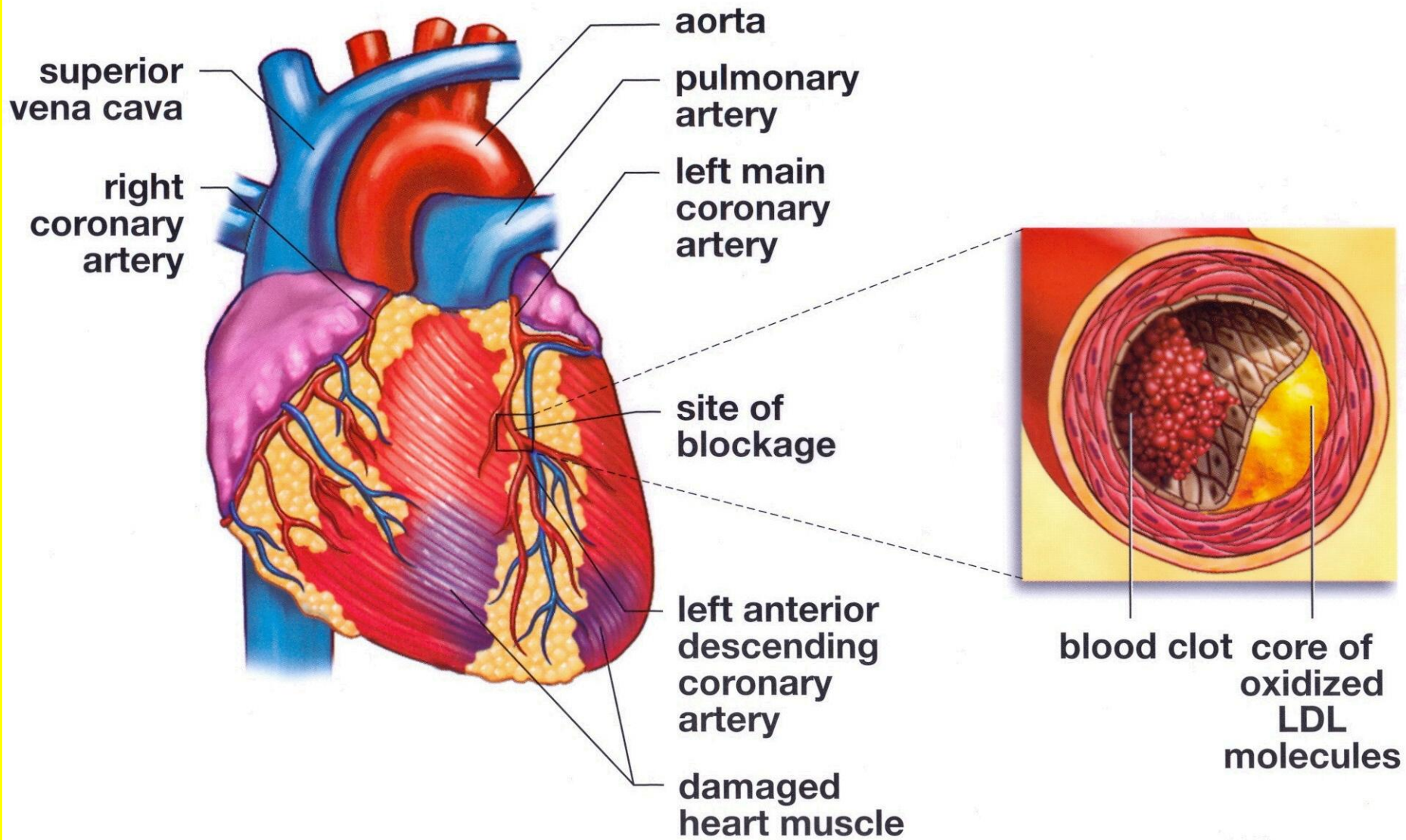
Genetics & high blood pressure

- Several **genes**: affect arteries & kidneys: produce hypertension
- Made worse by sodium/potassium imbalance in diet



Hypertension, heart attacks, stroke

- Blood pressure: **shearing** affect (stress)- artery lining
- Drives **cholesterol** into arteries
- Cholesterol deposits- build up
- Blockage → **heart attack**
→ **stroke**



High blood pressure water pill: **diuretic**

- Loss potassium → urine
- Replace with OJ, bananas, potassium supplement
- Potassium **helps** diuretic lower Blood Pressure
- ↑ potassium diet/supplement: people reduce/stop B.P. pills



Natural way to control blood pressure

- Return to caveman diet
- Dietary Approaches to Stop Hypertension (**DASH**) Eating Plan
- National Heart, Lung & Blood Institute

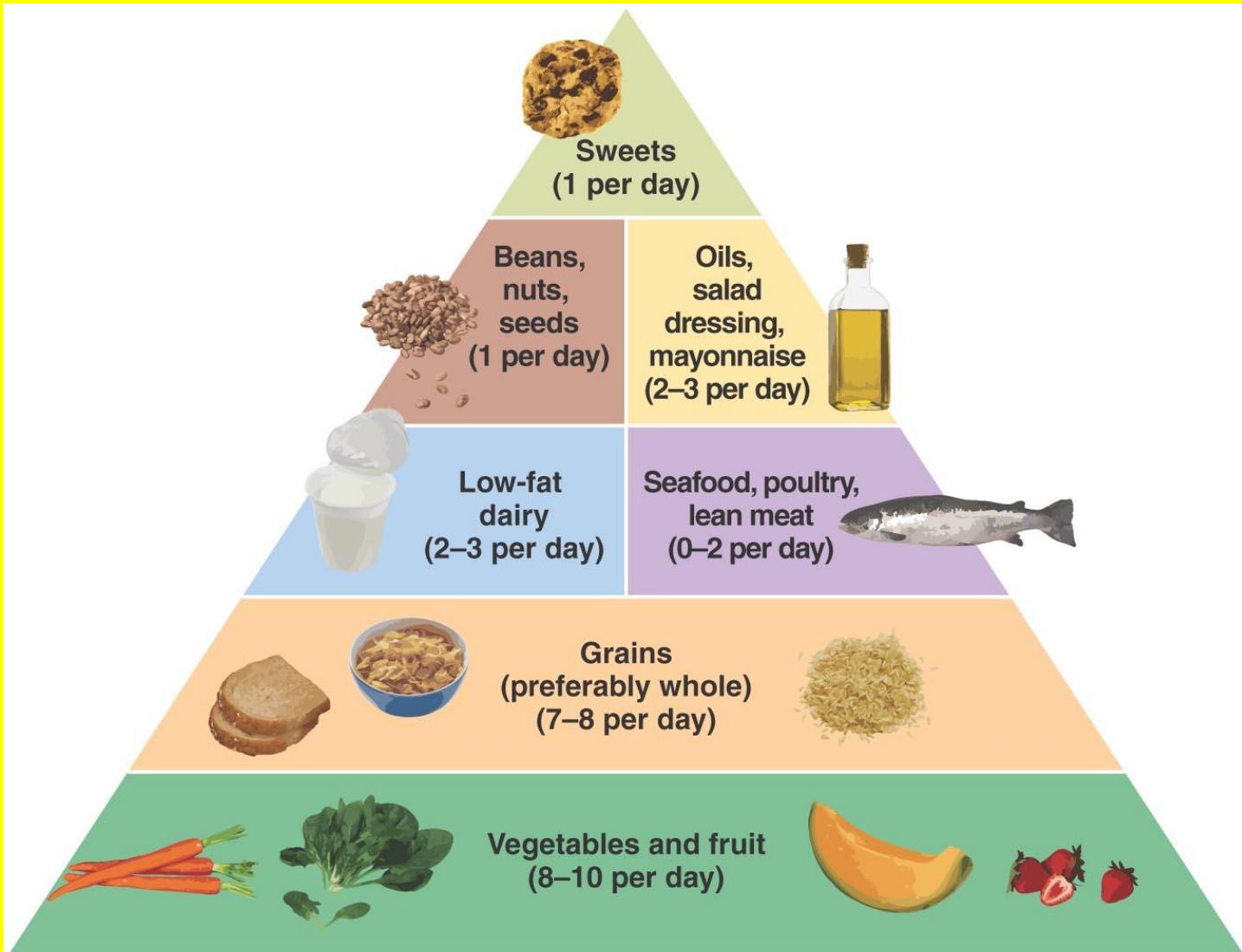


DASH

- ↑ Fruits & veggies, whole grains
- Low fat milk (calcium) products
- Eat more: poultry, fish, nuts
- Eat less: red meat, sugar in processed foods/drink

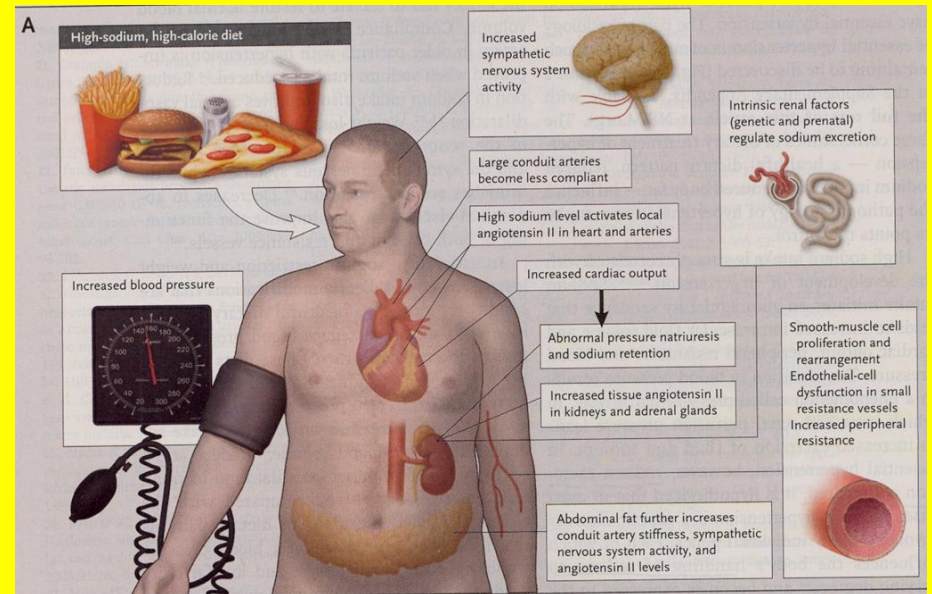
**If all Americans ate DASH:
dramatic drop in heart
attacks/stroke**

DASH DIET



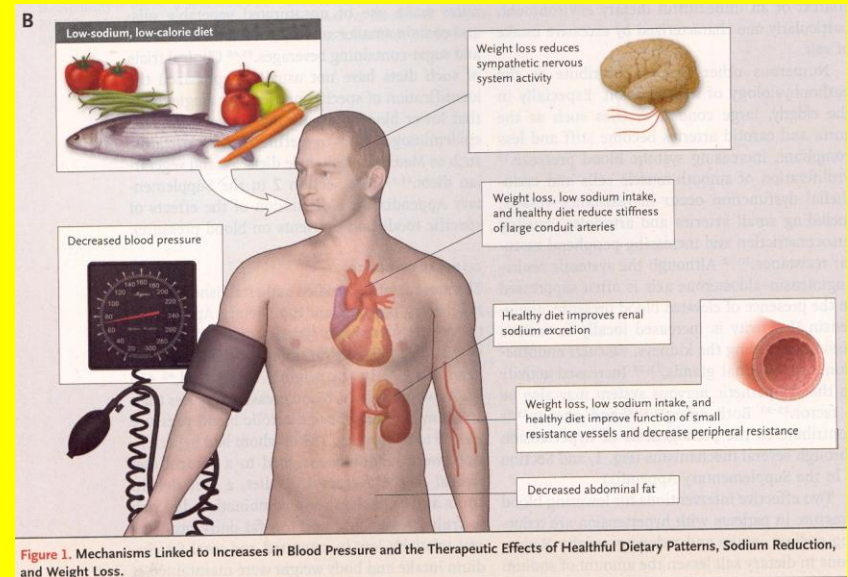
High sodium, high calorie diet

- Arteries Stiff
- ↑ Sympathetic Nervous activity
- Abnormal kidney activity



Low sodium, Low calorie diet

- ↓ Blood vessel Resistance
- ↑ Kidney sodium excretion
- ↓ Nervous system activity
- ↑ Weight loss, ↓ abdominal fat



SALT HAPPENS.



FIGHT BACK.



Help control blood pressure with NEW Promise® SuperShots® as part of a potassium-rich, low-sodium diet

Because salt is hidden in lots of foods, these delicious fruit blends are a good source of potassium. Diets that provide potassium help flush sodium from your body. And diets containing foods that are good sources of potassium and low in sodium may reduce your risk of high blood pressure and stroke.

Promise® SuperShots®—a deliciously unique way to have more potassium in your life.

For more information on potassium benefits, go to WebMD.

Potassium benefits

WebMD

supershots


TIA's (Little Strokes)

- **Transient ischemic attacks**
- **Ischemia:** deficiency blood flow to organ
- Temporary ↓ blood to brain
- Few minutes- 24 hours
- Symptoms disappear

TIA symptoms

- Sudden weakness/numbness face/arm/leg (one side)
- Lack- coordination
- Vision loss/double vision
- Difficulty speaking/understanding
- Dizziness, loss balance, difficulty walking

Cause of TIA

- Fatty deposits (**plaques**) narrow brain arteries (atherosclerosis)
 - Plaque piece breaks loose
plug brain artery ← temporary
- 

WARNING: big stroke is on way

Get help **ASAP**

Stroke

- Often morning- during sleep
- Wake up: can't speak, paralyzed- one side



STROKE

STROKE

How to Avoid a Brain Attack

BY BONNIE LIEBMAN

In the first minute of a stroke, your brain loses an estimated 1.9 million cells—what you'd lose in three weeks of normal aging.

But the loss continues every minute the stroke is left untreated. If a stroke runs its usual 10-hour course, it can kill 1.2 billion nerve cells—what a normal brain loses over the course of 36 years.

That doesn't have to happen. "Stroke is a highly treatable disease, but unfortunately, the time in which physicians can effectively reverse a stroke is short," says UCLA neurologist Jeffrey Saver.

"Precious tissue is lost every second," he explains. "Patients need to get to the hospital at the first sign a stroke is occurring."

If they get there within three hours, doctors can use a clot-busting drug like tPA (tissue plasminogen activator) to curb the damage. But many victims wait, hoping the symptoms will disappear.

"Don't try to tough it out, and don't waste time trying to get in touch with your primary physician or a neurologist," says Saver, who calculated the brain cell losses. "You need emergency help."

Continued on page 3.

Signs of a Stroke



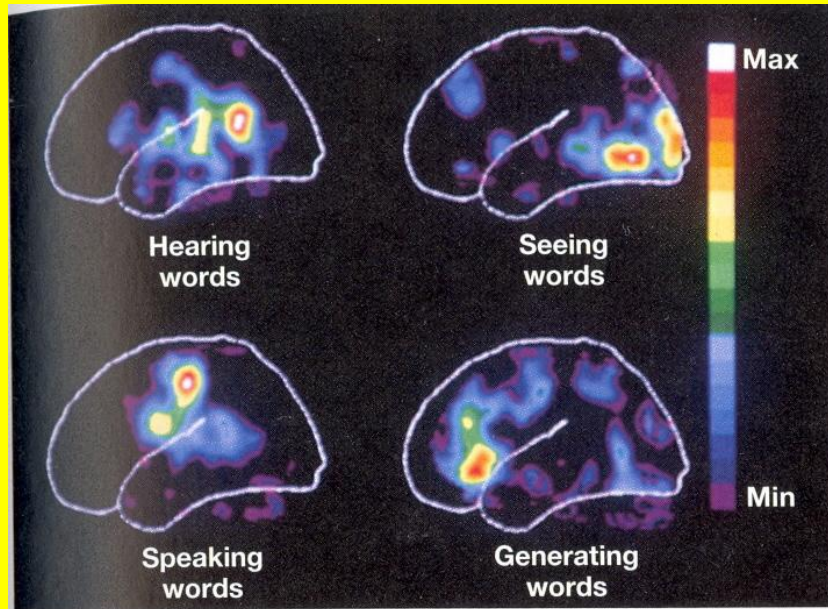
If you or someone else has one or more of these warning signs, don't wait.

Call 911 immediately, even if the signs go away.

Other, less common signs include double vision, drowsiness, nausea, or vomiting.

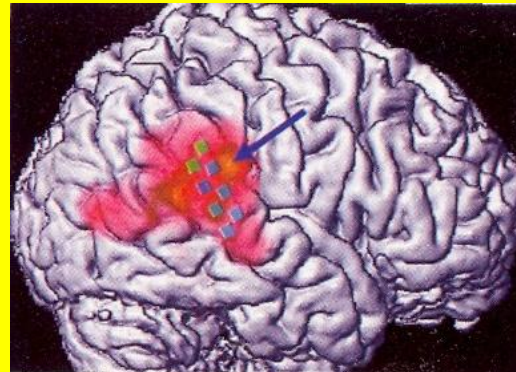
Adapted from *J. Amer. Med. Assoc.* 279:1324, 1998. ©1998, American Medical Association.

Normal brain functions



■ FIGURE 9-17 PET scan of the brain at work

Out-of-body
experience
PET Scan



Stroke



The arrow reveals an area of brain tissue affected by a stroke as shown on a magnetic resonance image (MRI).

Stroke: warning signs

- Sudden numbness/weakness-face/arm/leg: one side
- Confusion: trouble speaking/understanding
- Trouble seeing: one/both eyes
- Trouble walking, dizziness, loss balance/coordination
- Sudden: severe headache

Ischemic vs. hemorrhagic stroke

- Ischemic: due to atherosclerosis
- Blood clot (thrombus) → rough plaque ← surface
- Or wandering clot (embolus) from heart valve/other artery body → death brain ← plugs brain artery cells

American Stroke Association

F A S T

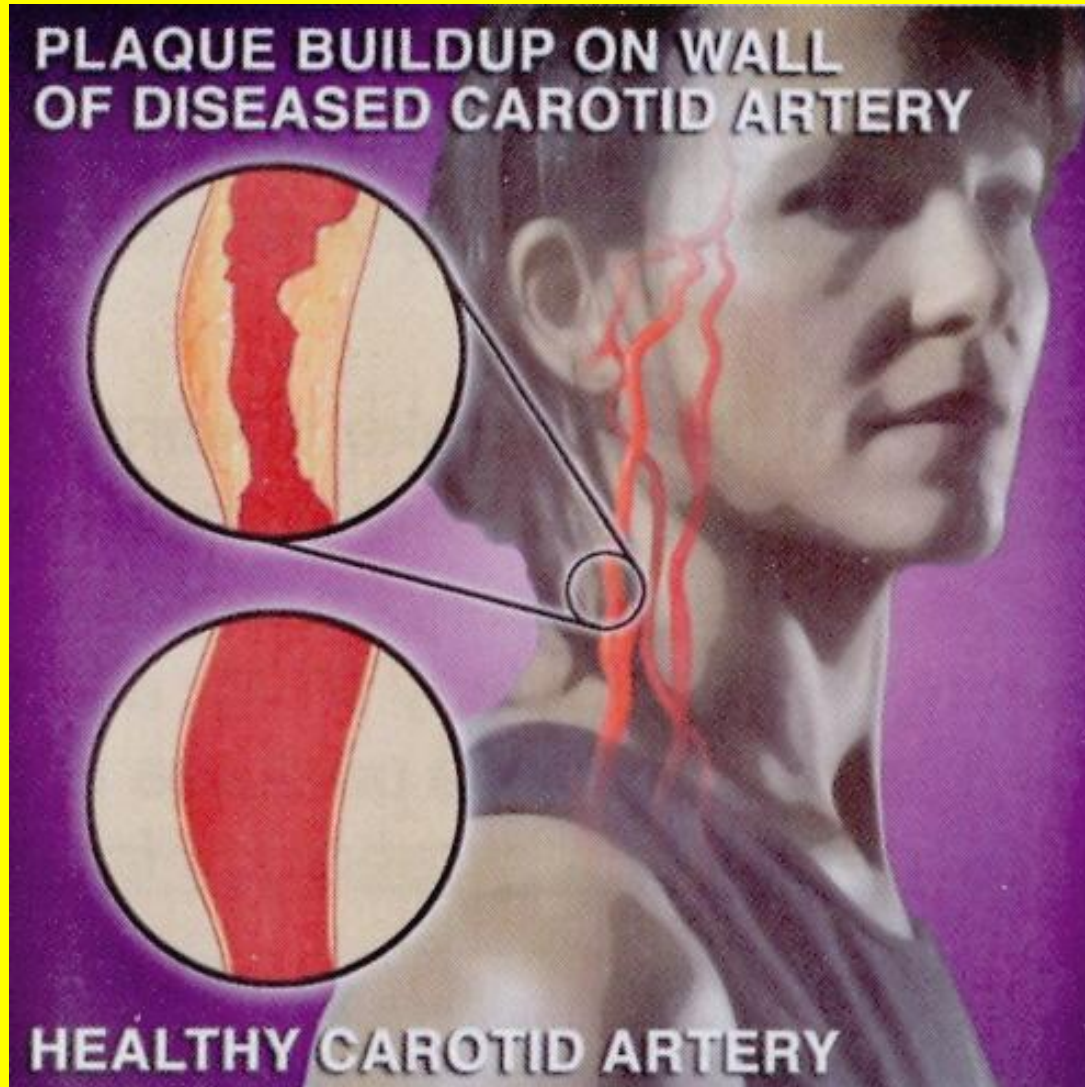
F Facial Droop

A Arm weakness, numbness

**S Speech difficulty,
Comprehension, Understanding**

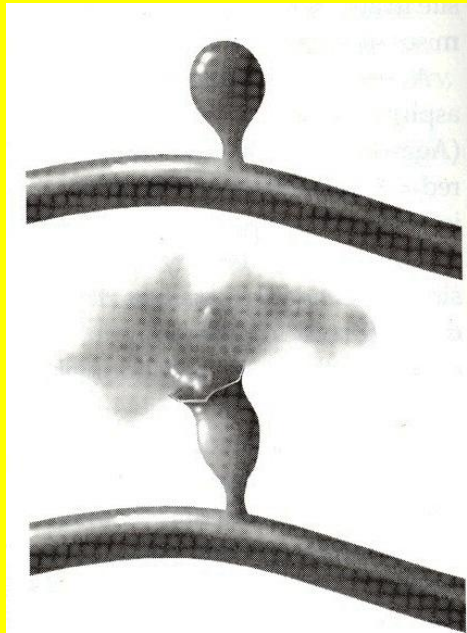
T Time: Get Help ASAP Call 911

Embolus



Hemorrhagic Stroke

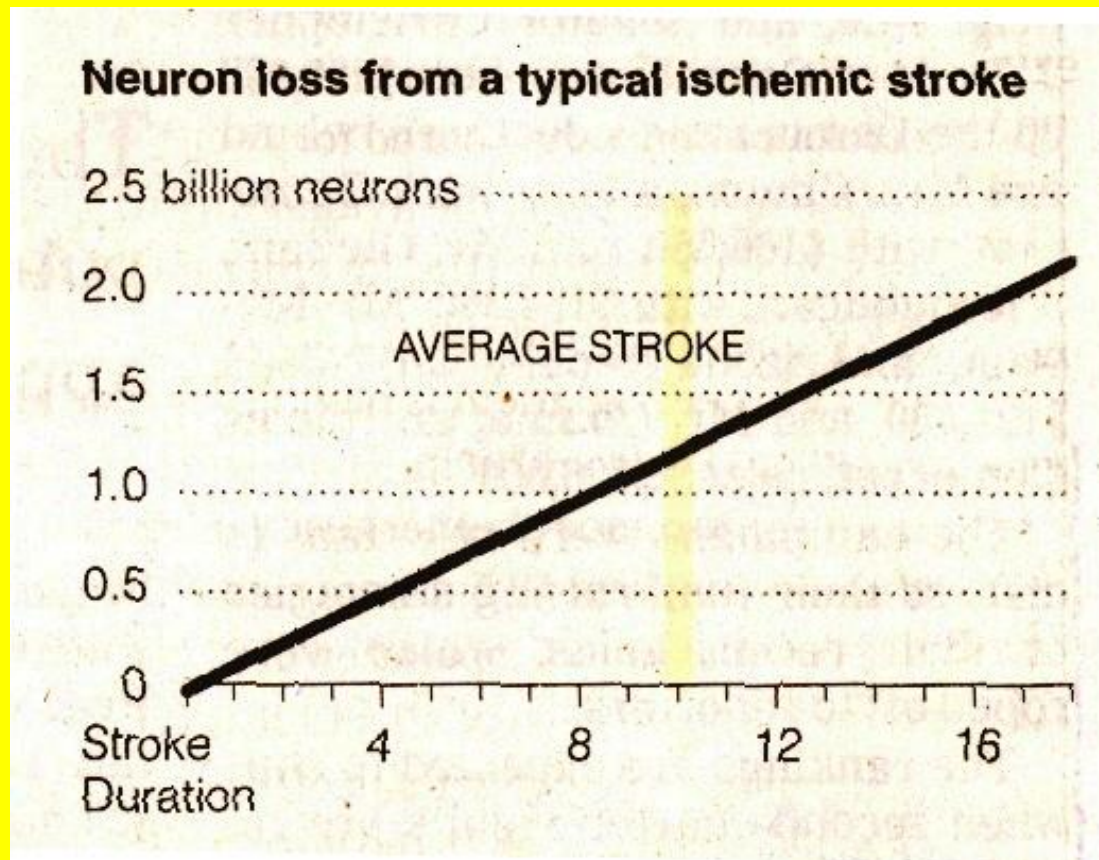
- Artery in brain leaks or ruptures



An aneurysm is a ballooning of an artery from a weak area in its wall. Over time, the wall stretches and becomes thin enough to rupture.

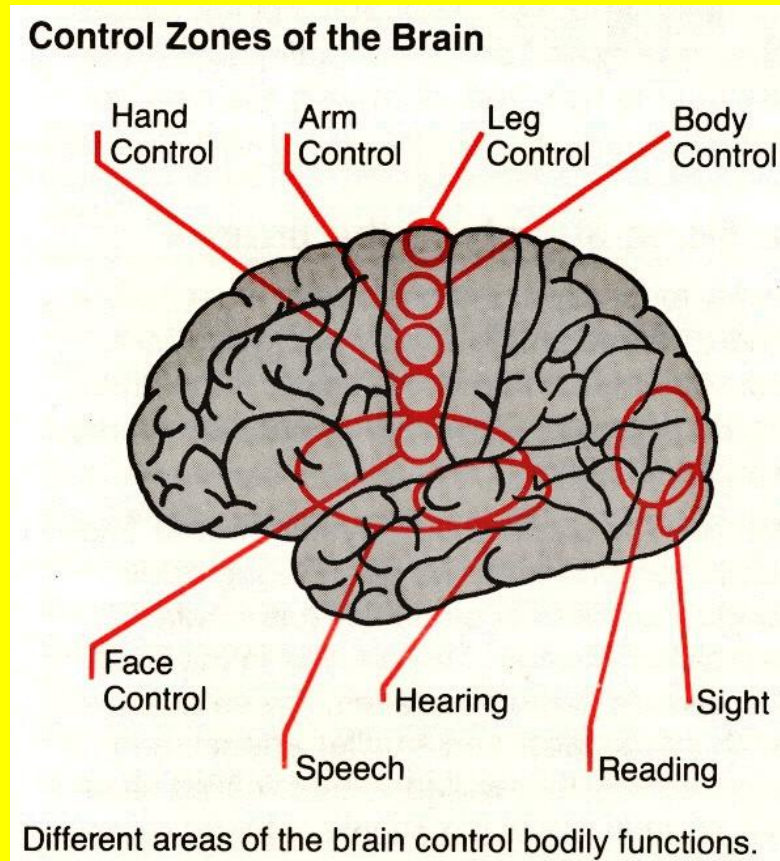
Death- brain neurons: rapid

Average stroke: lasts **10** hours-
kills >5% of neurons in forebrain



- Stroke right side brain →
left side body ← impairs

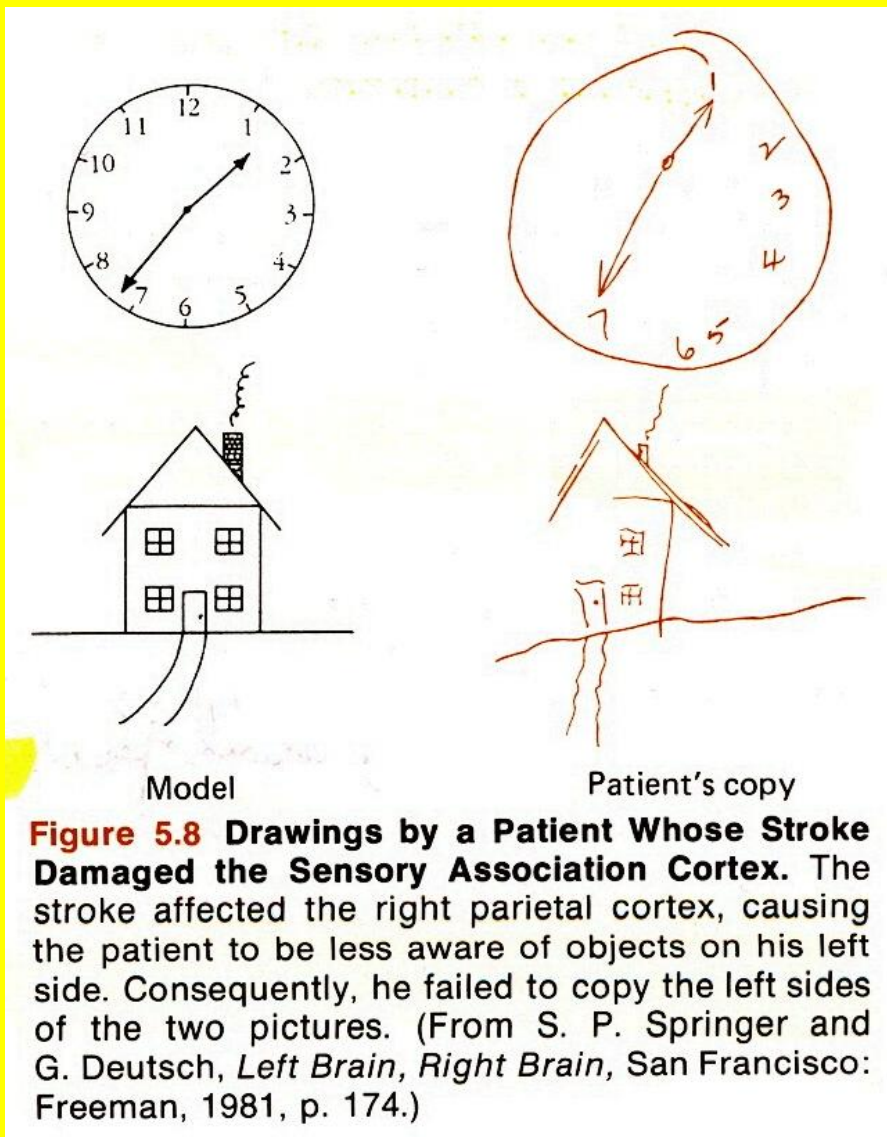
- Vice versa



Possible outcomes

- Difficulty understanding/speaking words (**word blindness**)
- Impaired movement, sensation, bladder/bowel functions, breathing, swallowing, balance, hearing, seeing, **coma**
- Psychological: **helplessness, frustration, mood changes**

Drawing by Stroke Patient

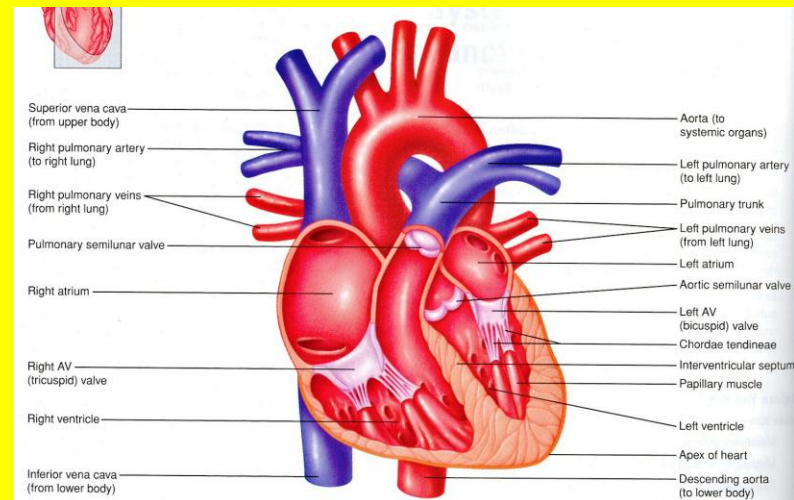
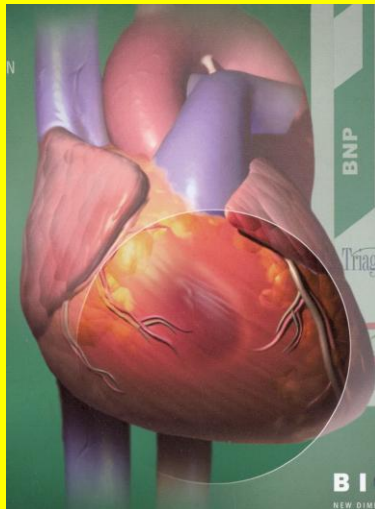


Stroke: Are you at risk? Risk Factors

- Family history: stroke or TIA
- ↑ Age
- **Women: 53%** stroke victims
Ages 45-54: 2X risk vs. men
- Blacks > whites
- ↑ Blood pressure

Stroke: Risk Factors

- Cardiovascular disease: congestive heart failure, heart attack, heart valve disease



Stroke Risk Factors

- Smoking
- Diabetes
- High blood cholesterol (LDL)
- Lack of physical activity
- Atrial Fibrillation (AFIB)
(15-20% of strokes)

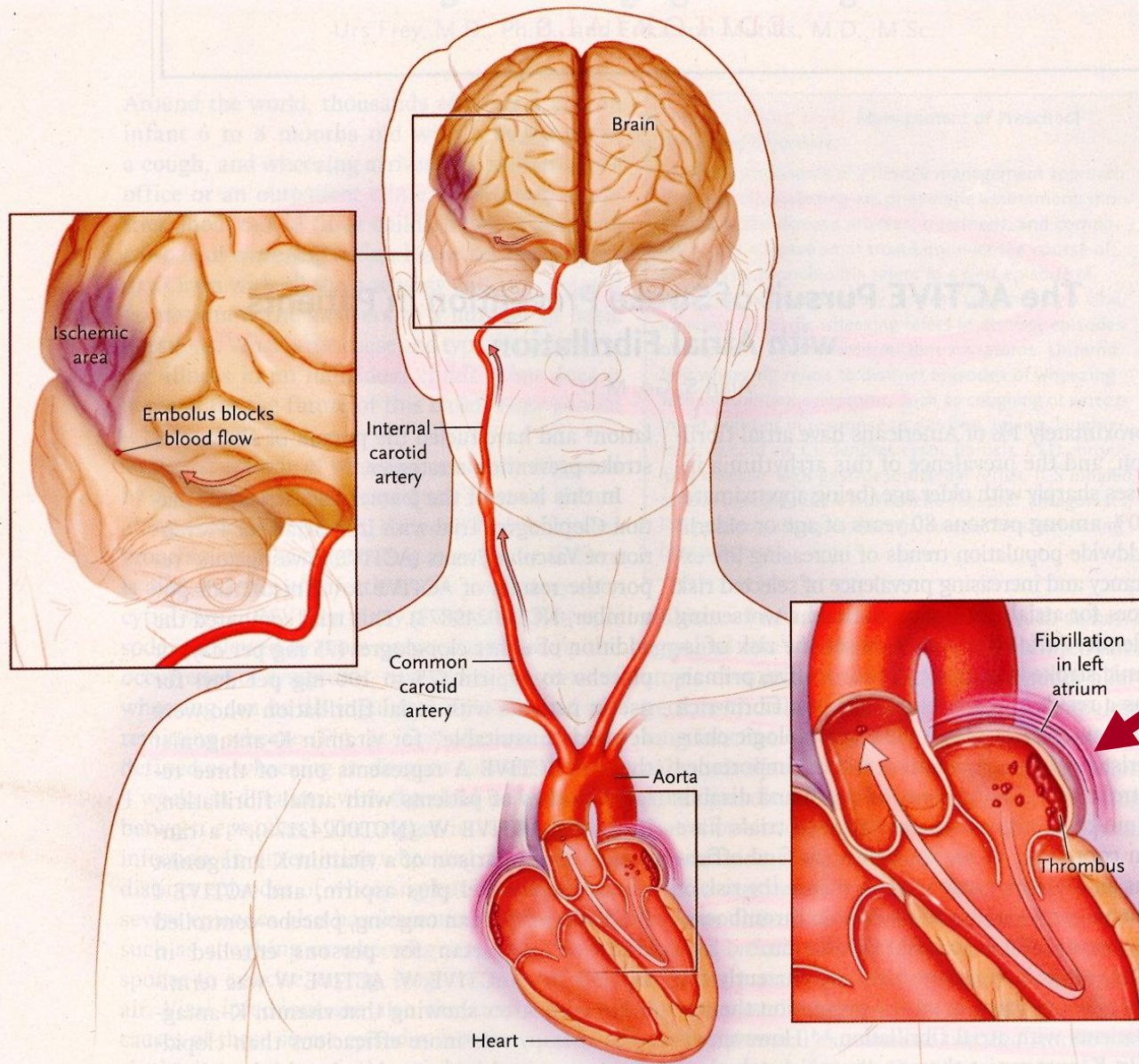


Figure 1. Mechanism of Cardioembolic Ischemic Stroke Caused by Atrial Fibrillation.

Stroke victim profile

- **Dr. Diana Fite:** ER doctor-
Houston, age 53
- B.P. 200/120 → nothing done



Stroke victim profile

- June 7, 2006- driving: right hand wheel, left hand cell phone
- Suddenly: right side body weakness
- Couldn't steer, couldn't take foot off gas pedal
- Ambulance: ER

ER treatment she requested

- **Injection: tissue plasminogen activator (tPA): dissolves clot**
- **The only effective ER treatment**
- **Must be given: within 3 hours**
- **Most people wait or ER's not properly equipped (stroke)**
- **She survived- no disability**

A Stroke in Progress

Beverly Sylvia: 49 N. Dartmouth, MA

- Dad: 15 years paralyzed after stroke



2009: morning numbness
Right arm, ? Pinched nerve

- Evening: shooting pool
with friends



- Symptoms worse: couldn't swallow,
talk: blurted out: **"STROKE"**
- **Friends didn't believe her**
- Sylvia: cell phone- calls best friend
- Taken to St. Luke's New Bedford

St. Luke's direct link
to MGH- Stroke
Center
(telemedicine)



- Just in time for **tPA**
- > 3 hours: brain hemorrhage risk
- **Made full recovery**

Stroke victim profile

- **Michael Collins-** police officer- Maryland, 49 years old
- Stroke in police car- numbness left hand
- Forced to retire:
Police must shoot either hands



Tedy Bruschi Linebacker Patriots

Stroke at age **32**

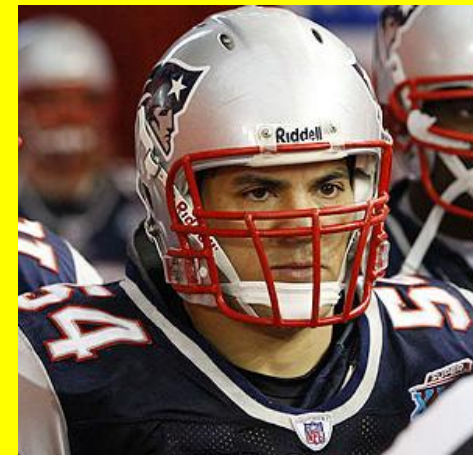
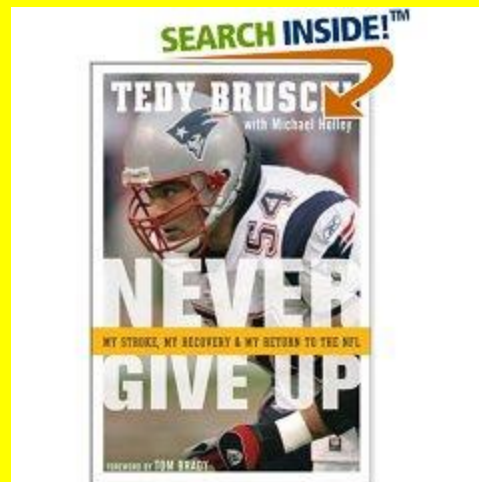
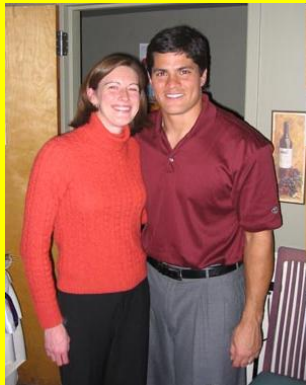
Blood clot- hole in heart → brain

“I woke up... pain in back of my neck.

Left side of my arms & leg felt

funny... some numbness.” Globe

9/2/05



Women and Strokes

- 800,000 Americans have strokes/year
- 3 out of 5 stroke deaths: women
- Women: **nontraditional** stroke symptoms

**Mental confusion,
disorientation, pain in face,
lightheadedness, weakness,
nausea, chest pains &
palpitations**

Women at risk of stroke

- **Menopause**
- **Abdominal obesity**
- **Hormone replacement therapy
(estrogen +/- progestin)**
- **Atrial Fibrillation**
- **Migraines**

Stroke Prevention Women

- **Control blood pressure**
- **Stop smoking**
- **↓ Cholesterol & Triglyceride**
- **Regular exercise**
- **Limit alcohol (1 drink/day)**
- **Overweight or obese: lose weight**
- **> 65: AHA: 81 mg aspirin/day**

Stroke Rehabilitation



Robotics & Strokes

After the stroke: **Brain Plasticity**

Regain some : speech &
movement

- 1) New neural pathways
- 2) Transfer movement control: healthy
brain sections

Key: repetition- speech therapy/move
body parts: brain **"relearns"**

Stroke Rehabilitation

Restraint Therapy: restrain good arm/leg plus **training** of partially **paralyzed** arm or leg

- Forces brain make **new neural pathways**: partial use arm/leg



Robotic braces: arms or legs

- Joint sensors- monitor nerve activity
- **↑ ↓** Motorized help, faster recovery

Stroke patient tries
to move arm

Sensors: skin triceps sends

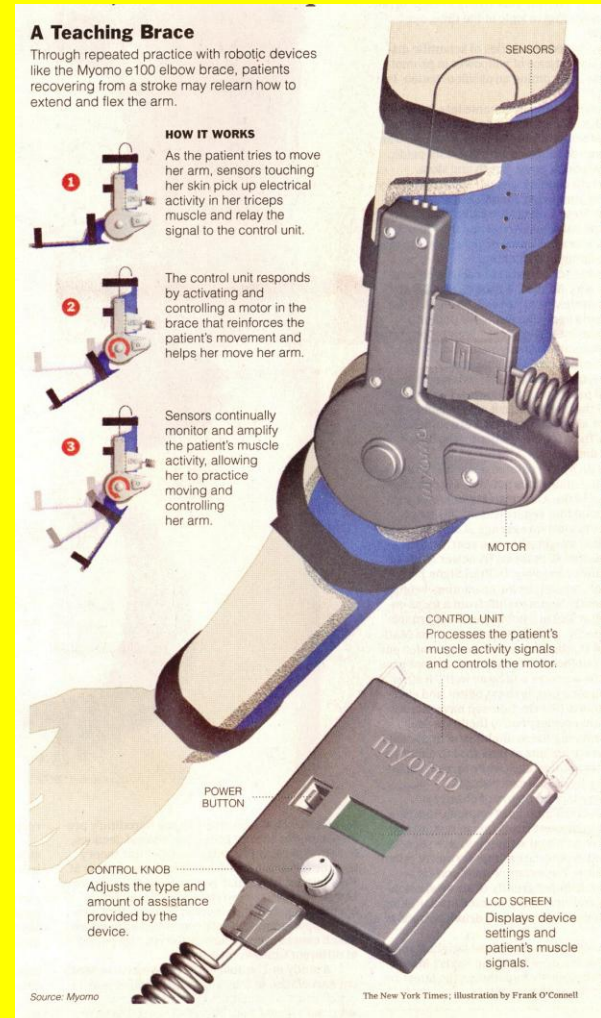
Signal → **robotic arm brace**

• Robot motor: **reinforces**

Patient's movements:

Arm moves

• **"Amplifies"** patient's
muscle activities



Are all pizzas created equal?

- Visit the following restaurants. Ask to see a **Nutrition Information sheet**. Note response. If hardcopy is not available, go to their WEB site to find nutrition information.
- Restaurants: **Pizza Hut, Papa Ginos, Pizzeria Uno, Dominos, Caesar's**

Get information for small cheese pizza

- Serving size (e.g. slice or pizza) and grams
- Calories
- Calories/gram
- Total fat (grams)
- Saturated fat (grams)
- Trans fat (grams)
- Cholesterol (milligrams)
- Sodium (milligrams)

Are all frozen pizzas the same?

- Visit a supermarket's frozen food section.
- Find the following frozen cheese pizzas: **Mystic, Stouffer's, Celeste, Ellios, DiGiorno, Tombstone, California Pizza Kitchen**

Get information for a cheese pizza

- Serving size (e.g. slice or pizza) and grams
- Calories
- Calories/gram
- Total fat (grams)
- Saturated fat (grams)
- Trans fat (grams)
- Cholesterol (milligrams)
- Sodium (milligrams)

2009 Survey: Domino's Pizza- Worst Tasting

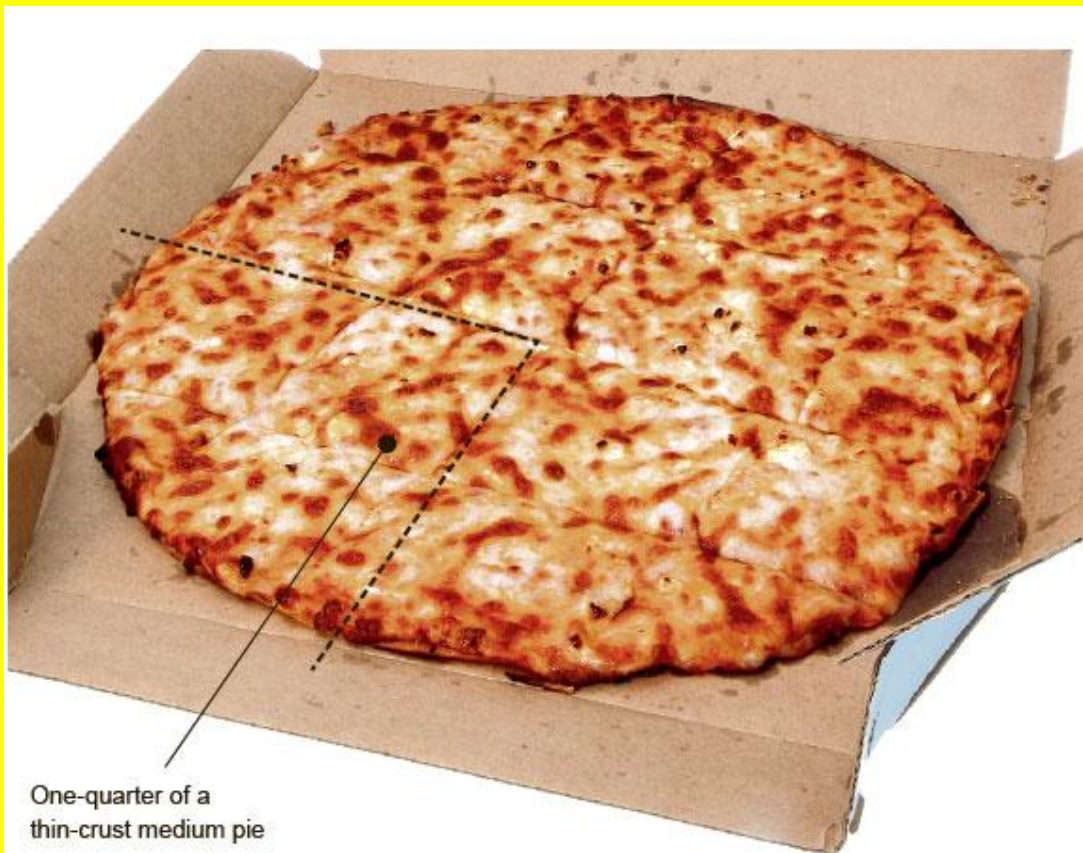


Dairy Management- teams up with **Domino's (2010)**

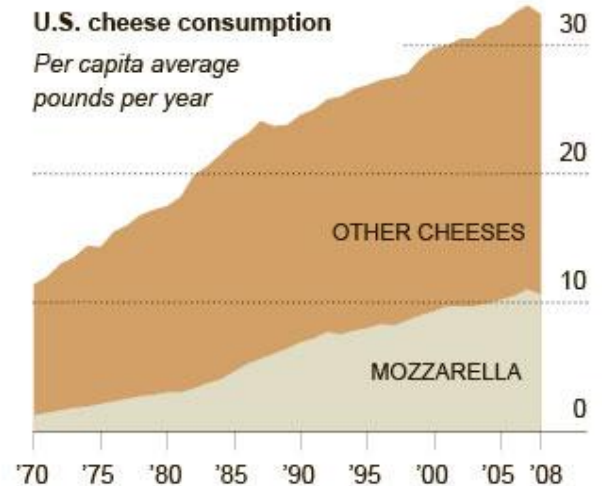
- Marketing campaign to increase American's **cheese** (dairy) intake
- Develop new line of pizza
- **40% more cheese**
- **↑** Dramatic increase in Domino's sales



Problem #1: **1** slice Domino's thin crust medium pizza = **2/3's saturated fat limit/day**



CONTENTS		PERCENT OF RECOMMENDED DAILY MAXIMUM*
Saturated fat	12 grams	77%
Calories	430	22
Sodium	990 mg.	66



Problem #2: **Dairy Management**

- Marketing Creation of **USDA**
- Provides several \$millions/year
- **Inconsistent**: promoting more **cheese** consumption by Americans (average 33 pounds/year) but also **anti-obesity campaign** and **low fat intake**
Cheese: main source **saturated fat** today

