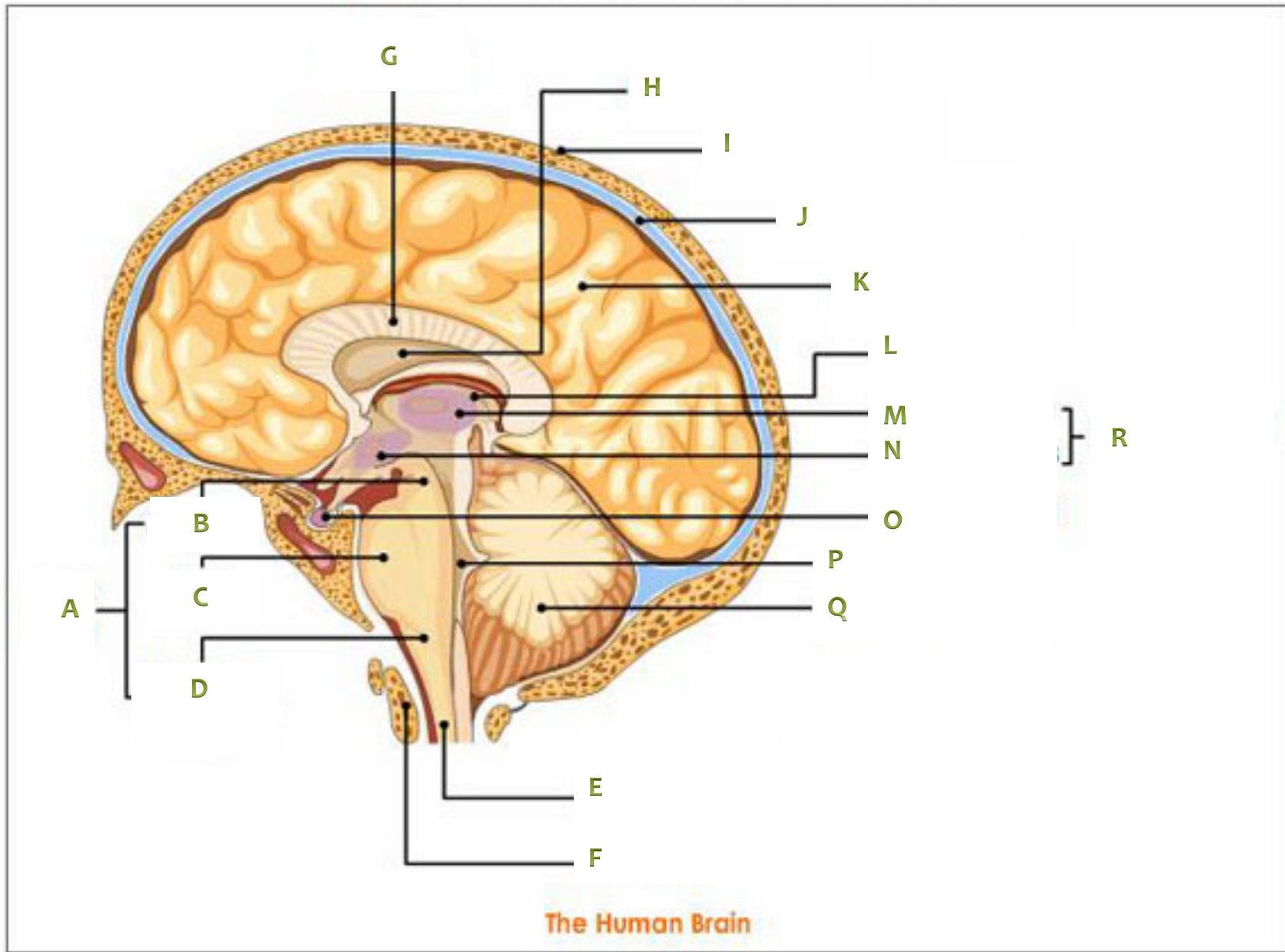
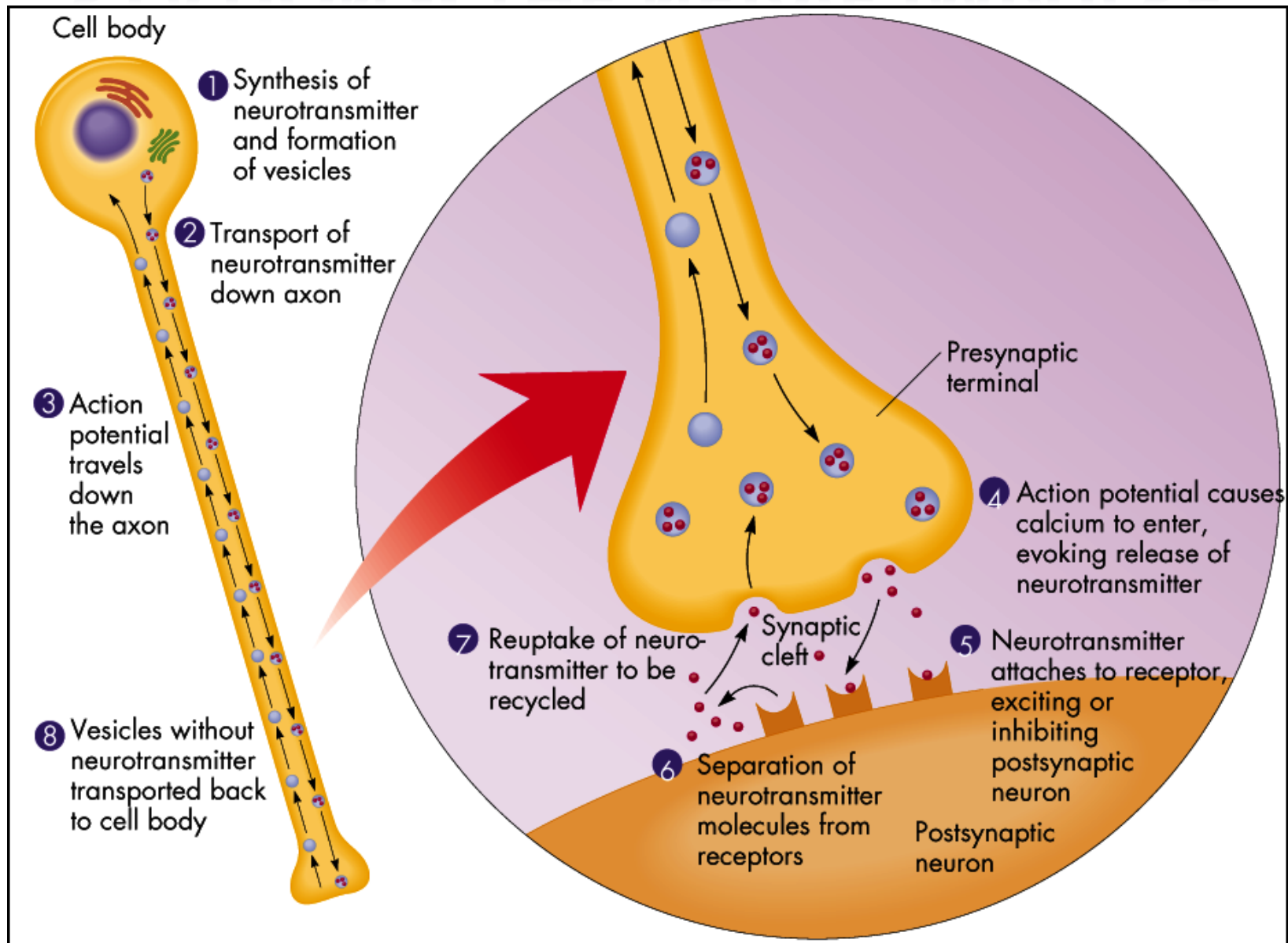


STATION 1: THE BRAIN



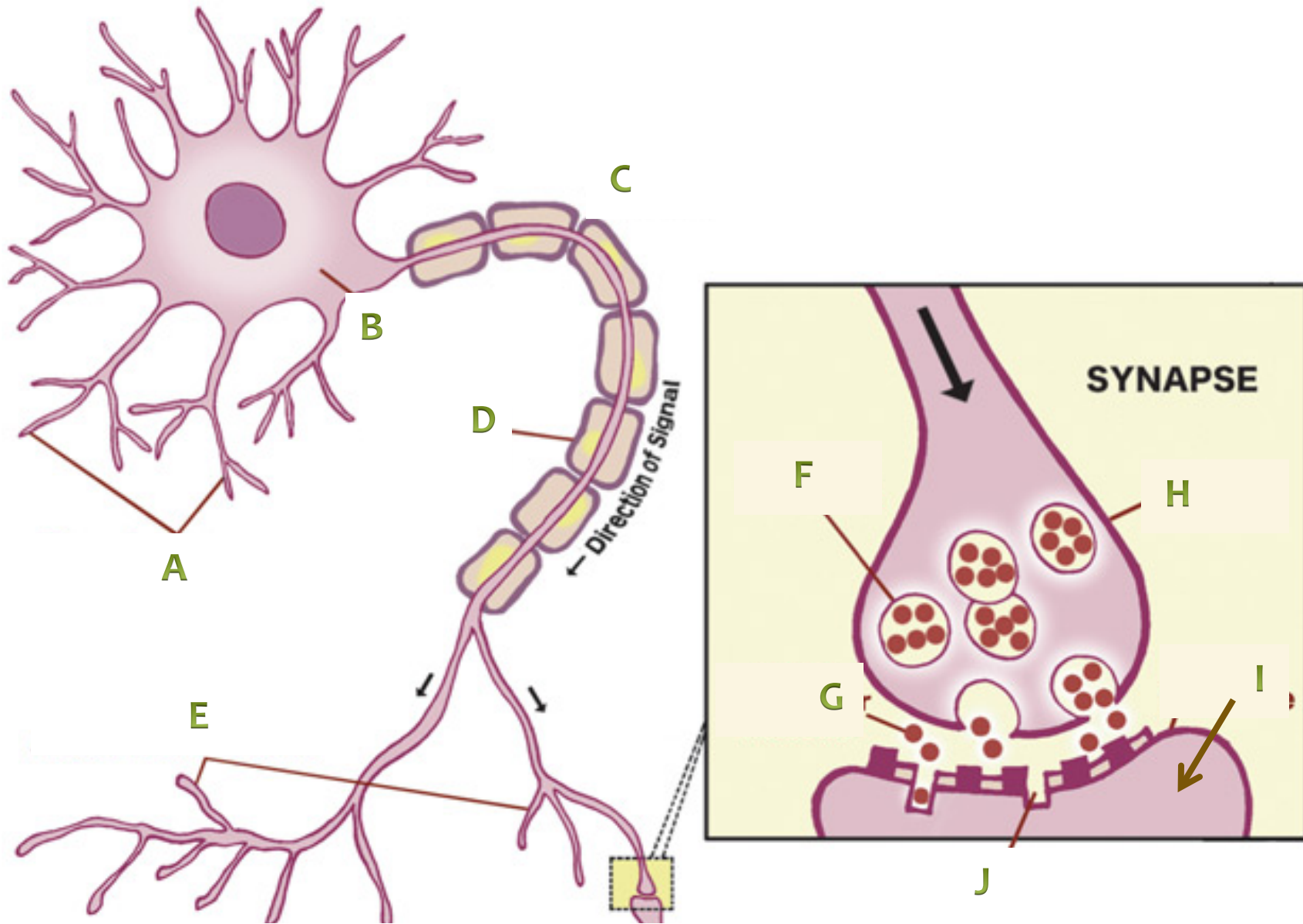
<http://images.tutorvista.com/content/control-coordination/human-brain.jpeg>

STATION 1: THE NERVE IMPULSE



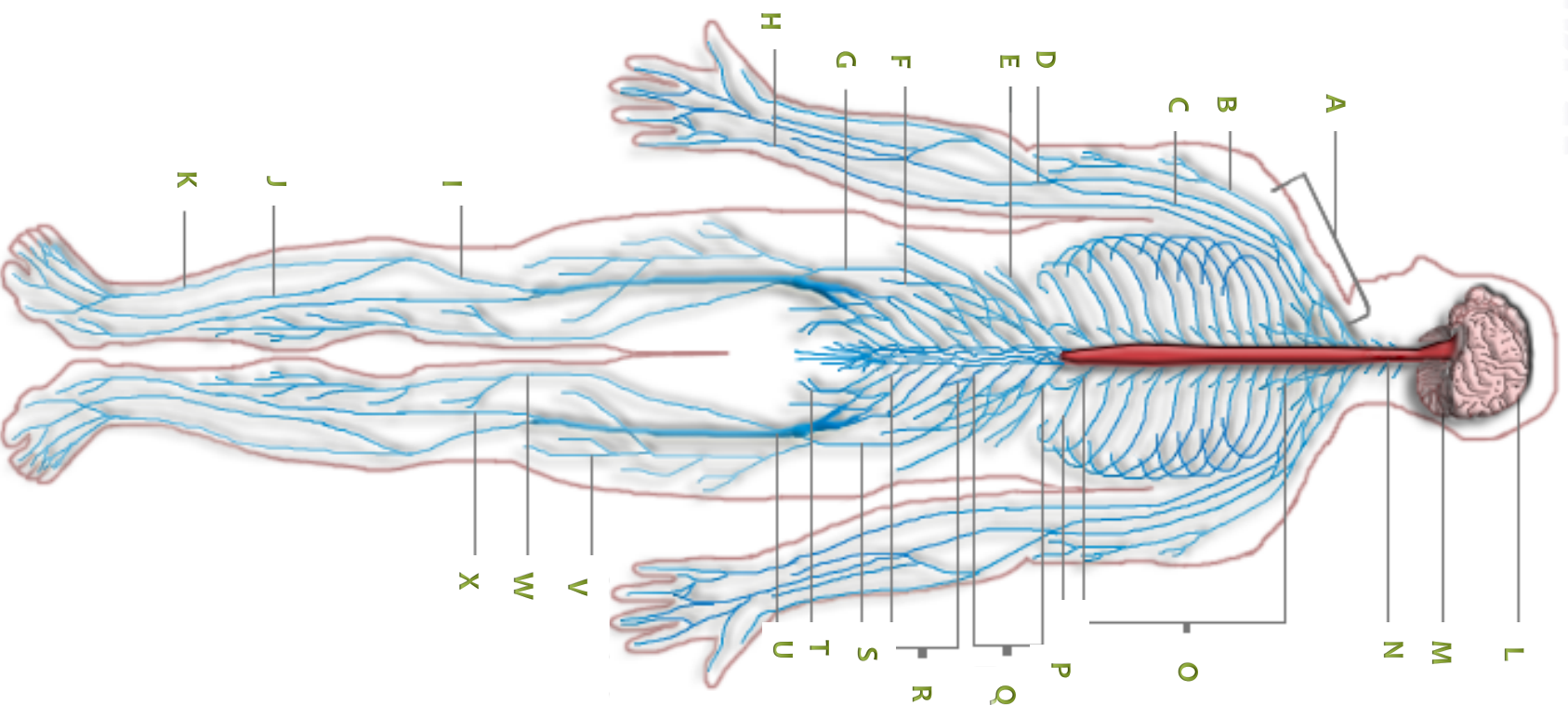
<http://my.fresnounified.org/personal/lygonza/gonzalez/Neuron/neuron-synapse%20communication.png>

STATION 1: THE NEURON



<http://www.urbanchildinstitute.org/sites/all/files/databooks/2011/ch1-fg2-communication-between-neurons.jpg>

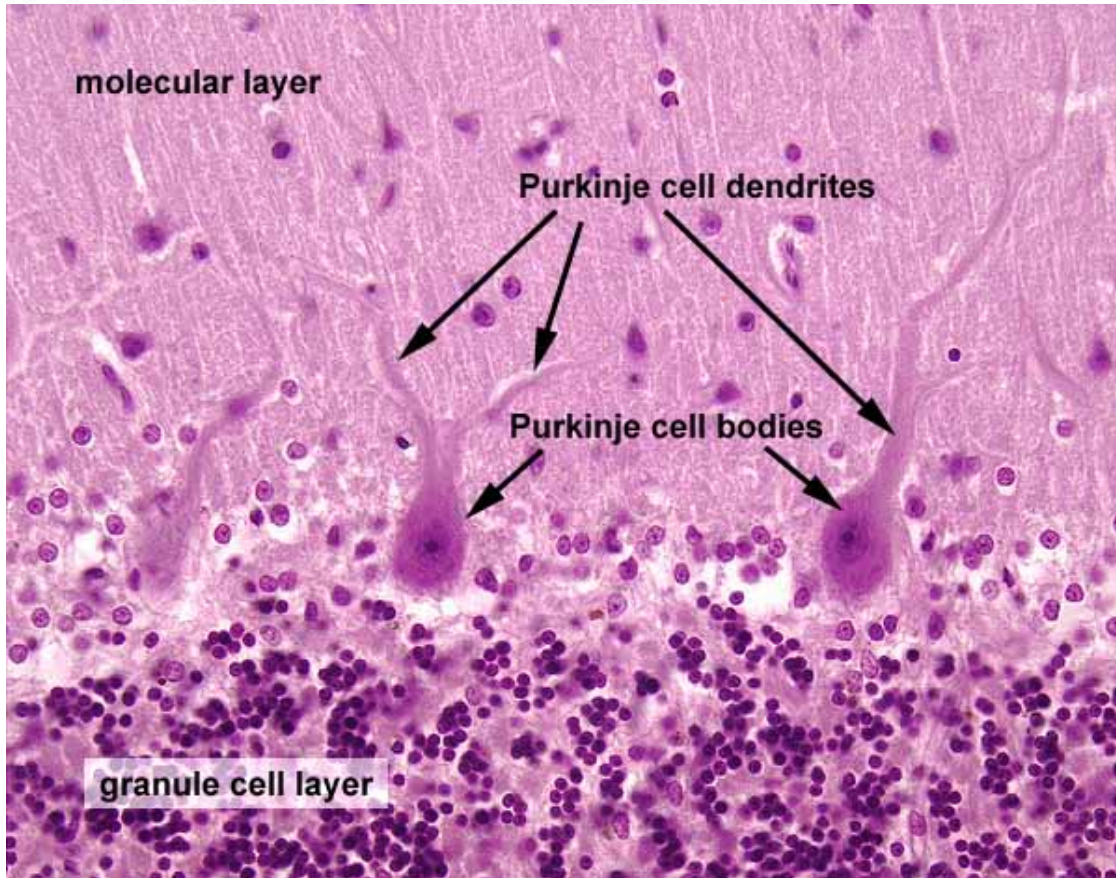
STATION 1: THE NERVOUS SYSTEM



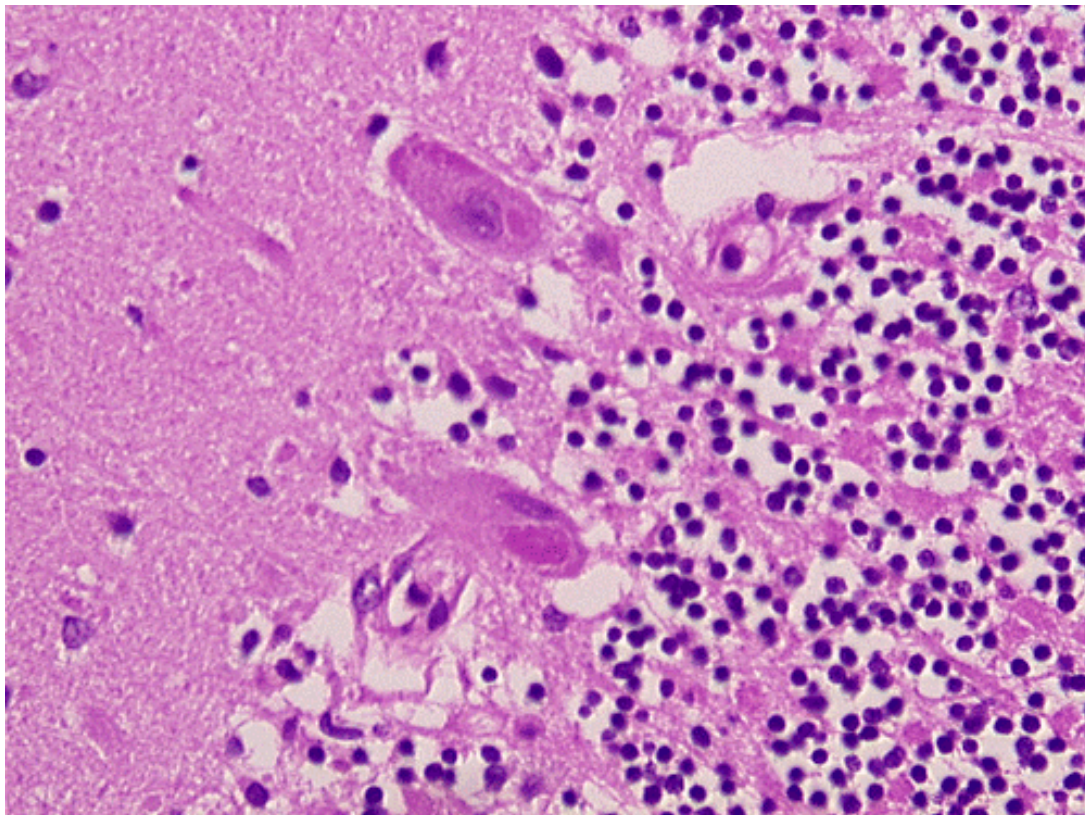
http://upload.wikimedia.org/wikipedia/commons/b/ba/Nervous_system_diagram.png

STATION 3: THE BRAIN (CEREBELLUM)

A



B

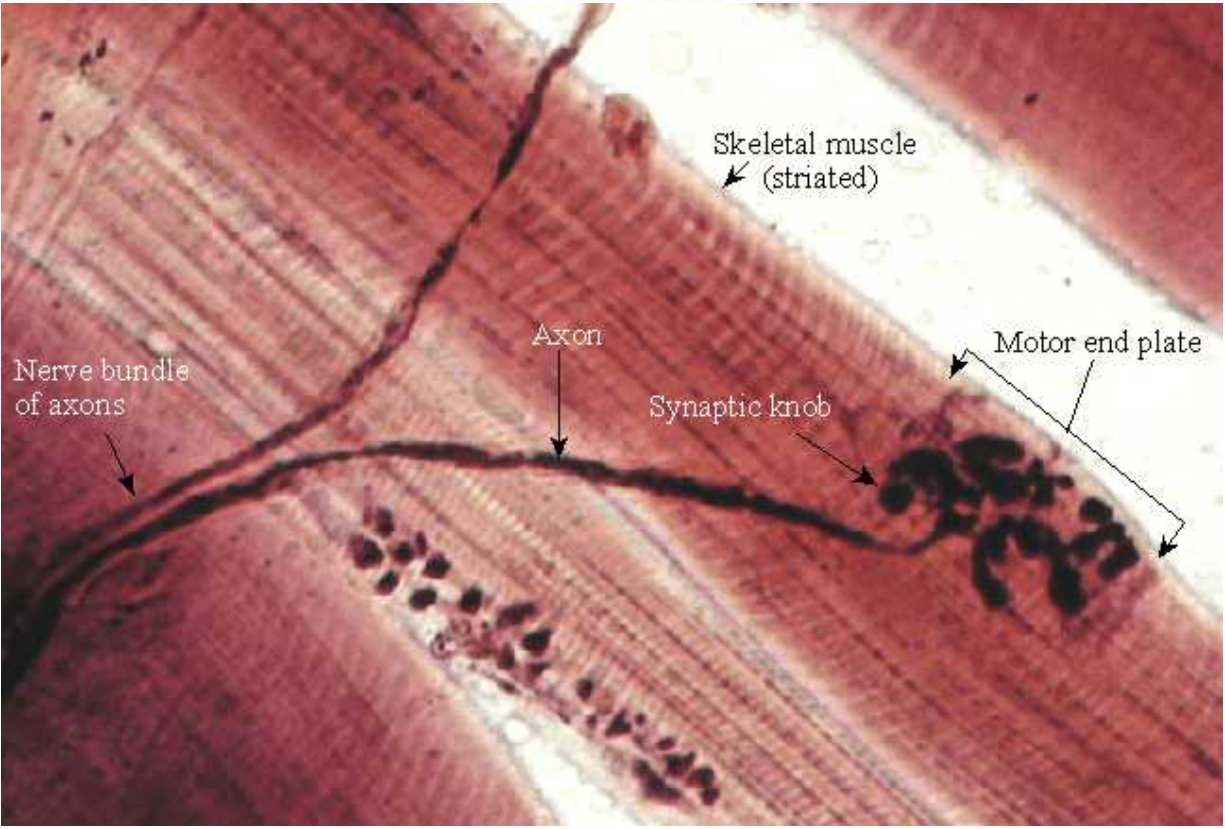


<http://www.siumed.edu/~dking2/ssb/images/NM031b.jpg>

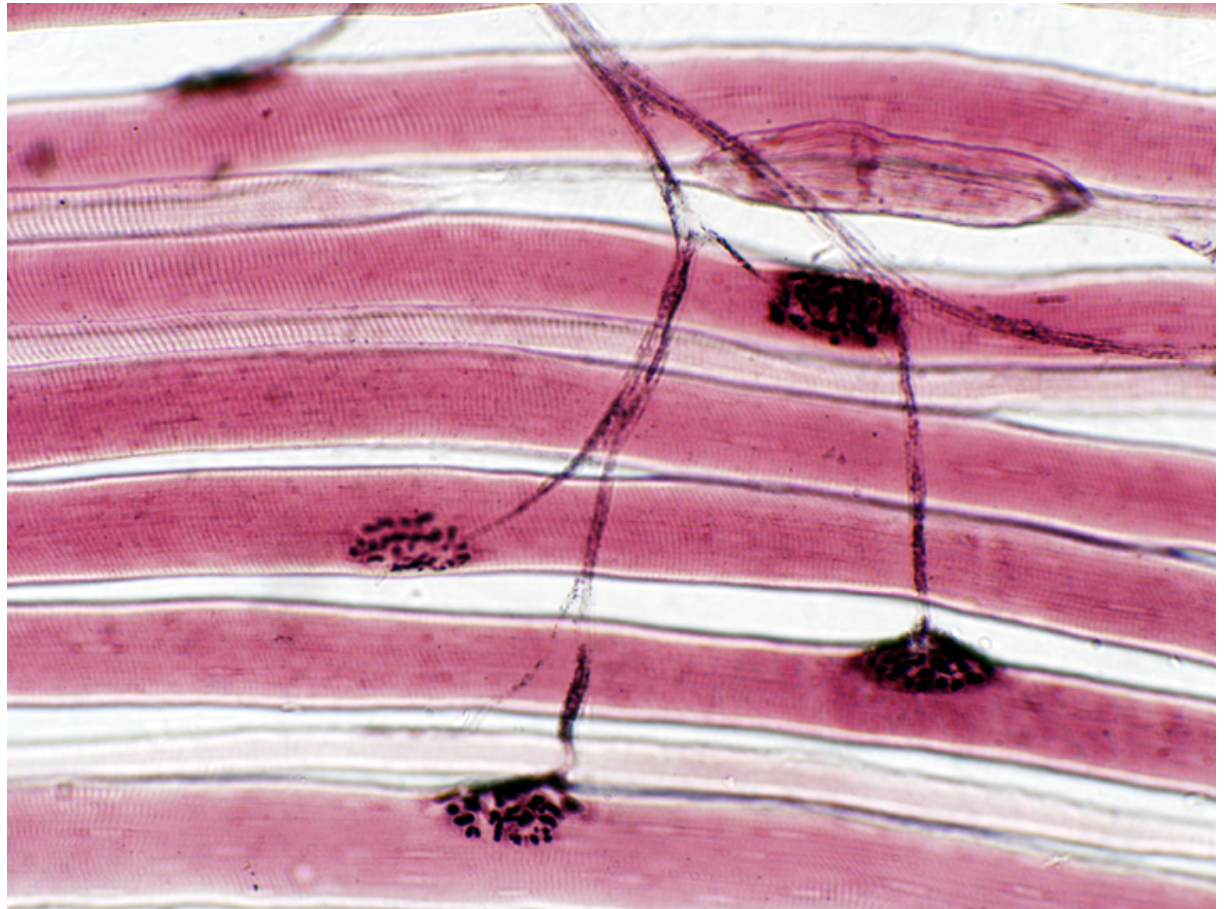
<http://moon.ouhsc.edu/kfung/jty1/Com/ComImage/Com308-1-Cerebellum-HM1.gif>

STATION 3: THE NEUROMUSCULAR JUNCTION

A



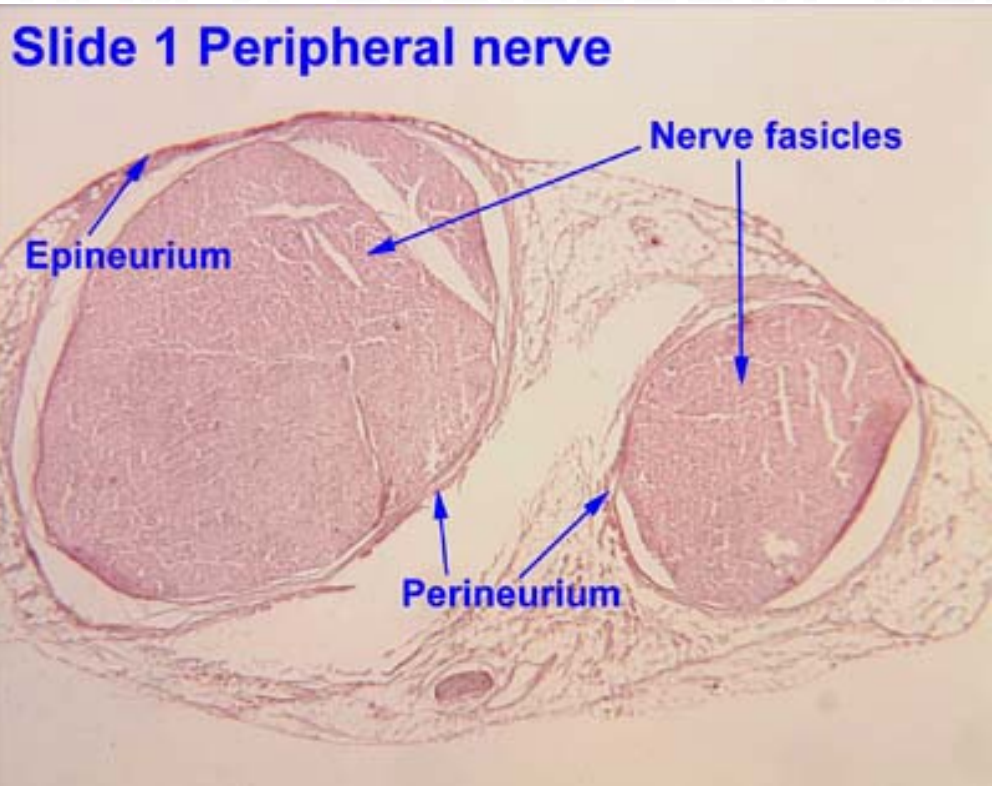
B



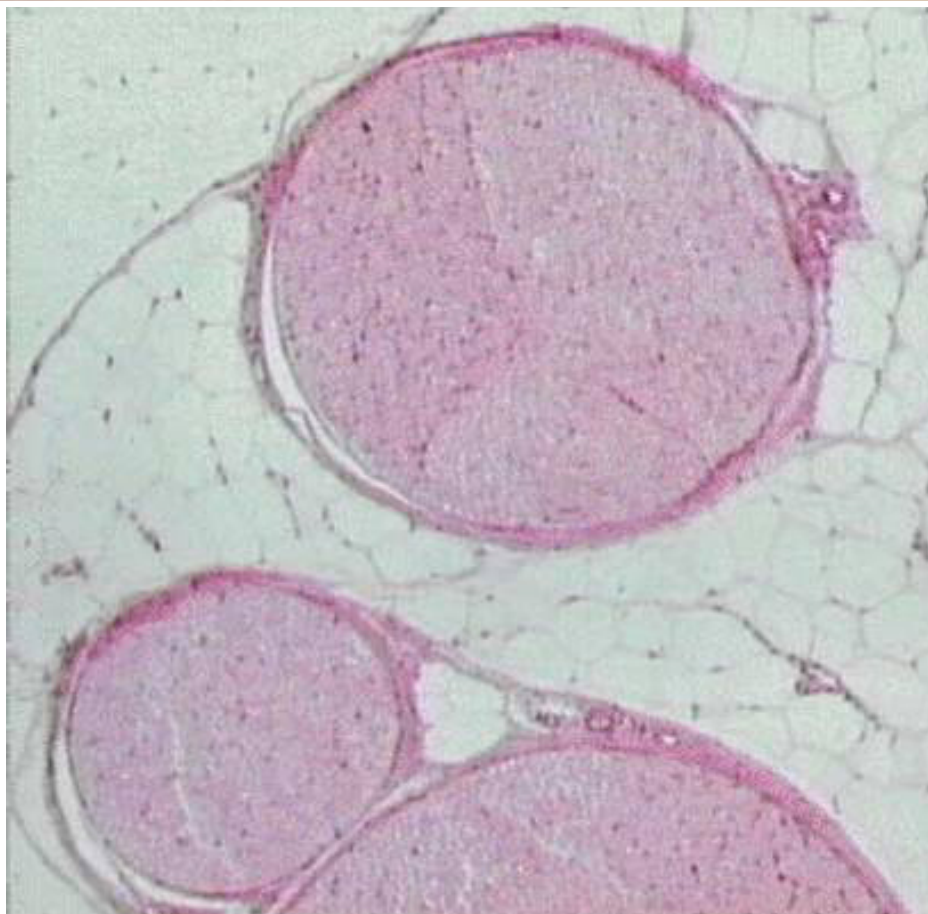
http://biology.clc.uc.edu/fankhauser/Labs/Anatomy & Physiology/A&P202/Nerve_Histology/motor_end_plate_400x_PC231459_labeled.JPG
<http://stevegallik.org/sites/histologyolm.stevegallik.org/images/motorendplates.jpg>

STATION 3: PERIPHERAL NERVE

A



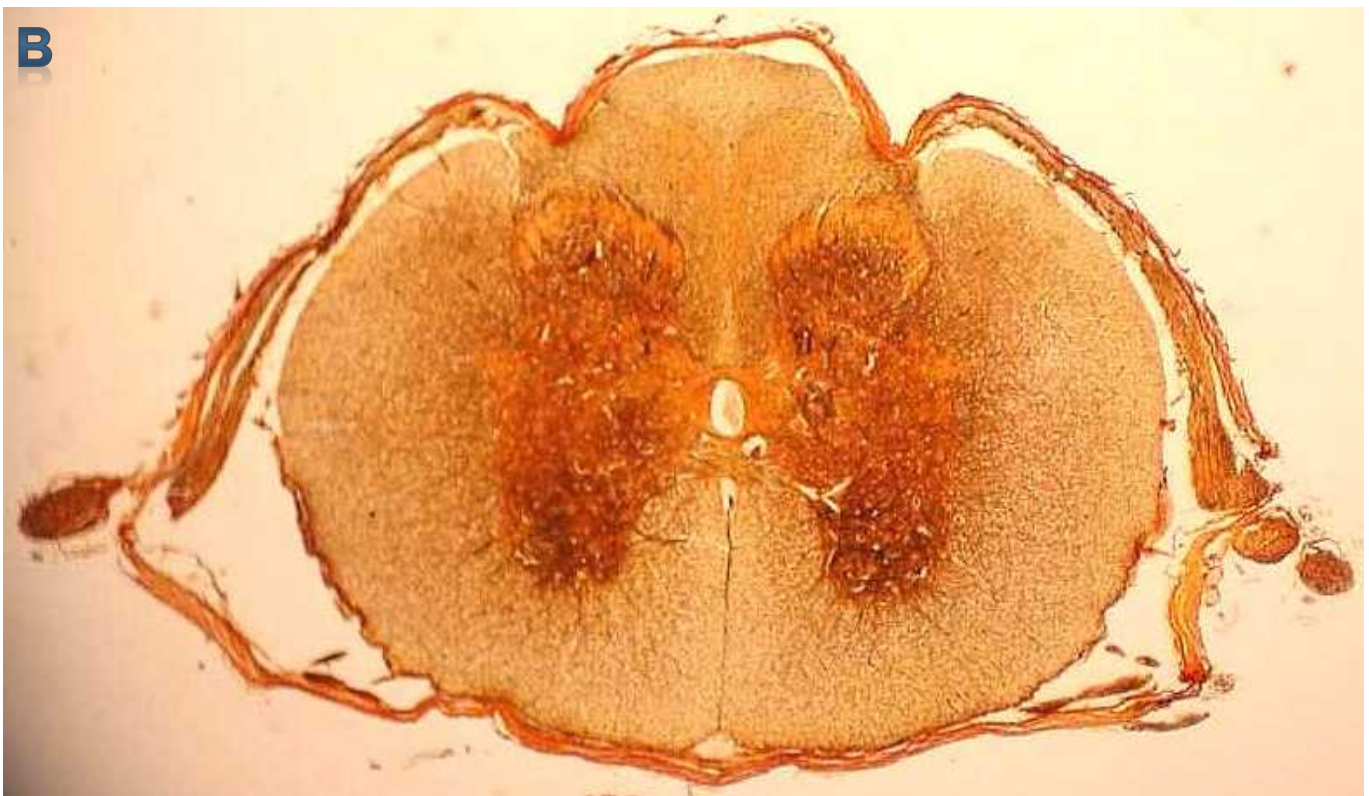
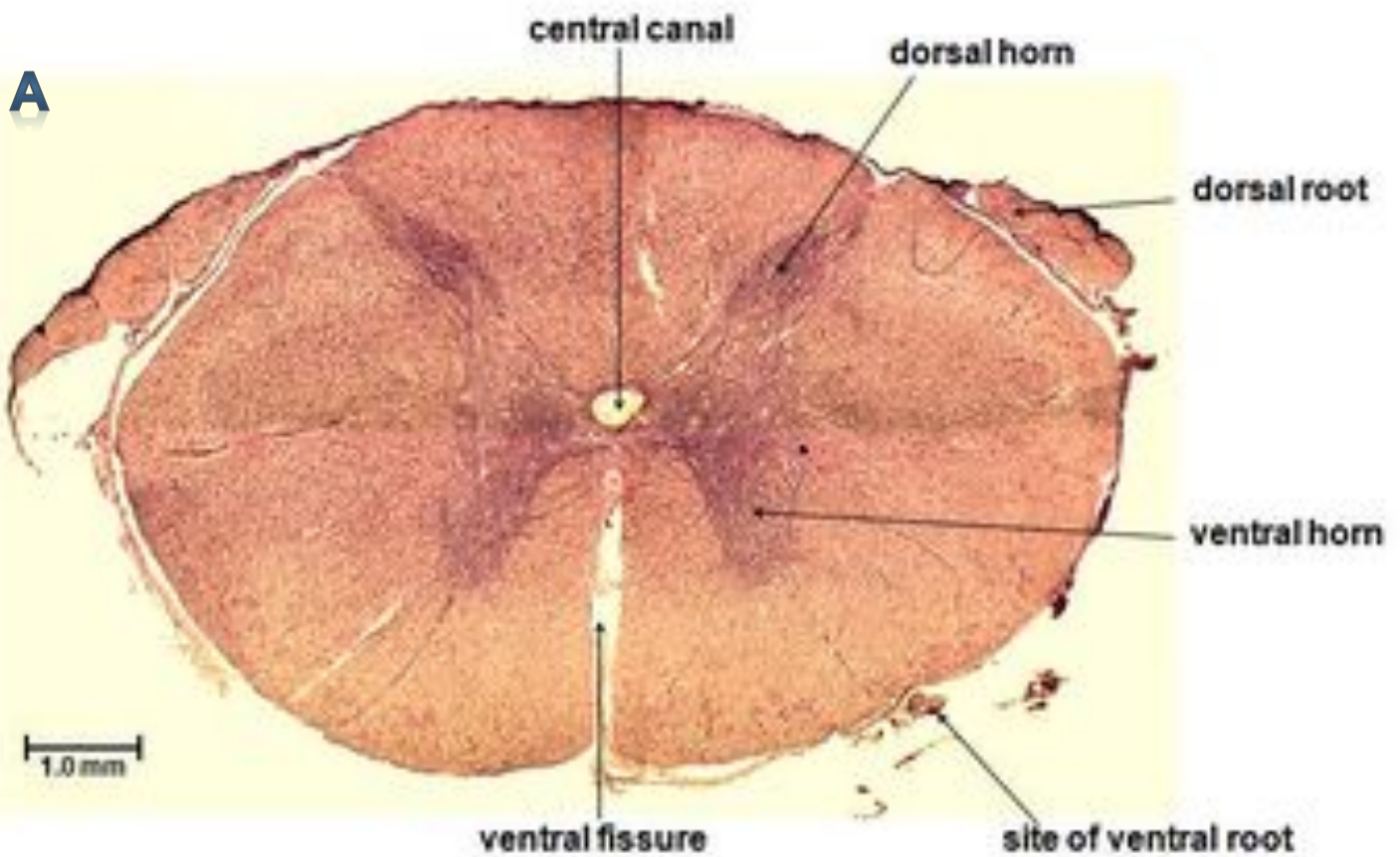
B



http://www.ouhsc.edu/histology/Glass%20slides/1_02.jpg

<http://apbrwww5.apsu.edu/thompsonj/Anatomy%20&%20Physiology/2010/2010%20Exam%20Reviews/Exam%204%20Review/nerve.c.s.-a.jpg>

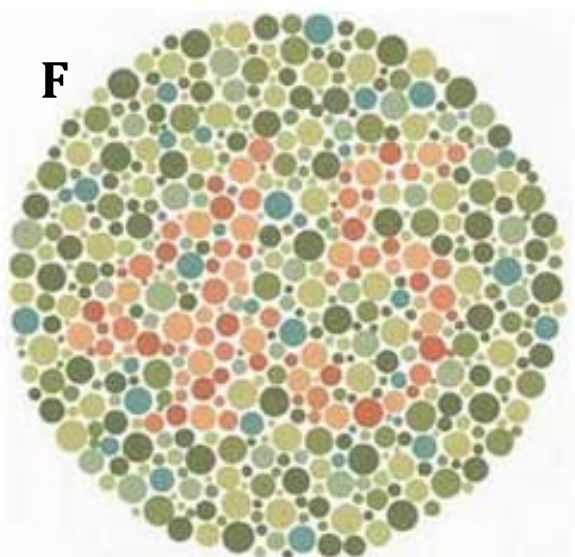
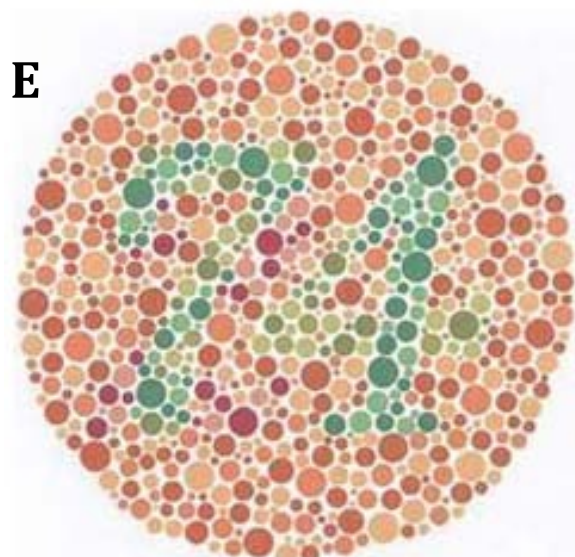
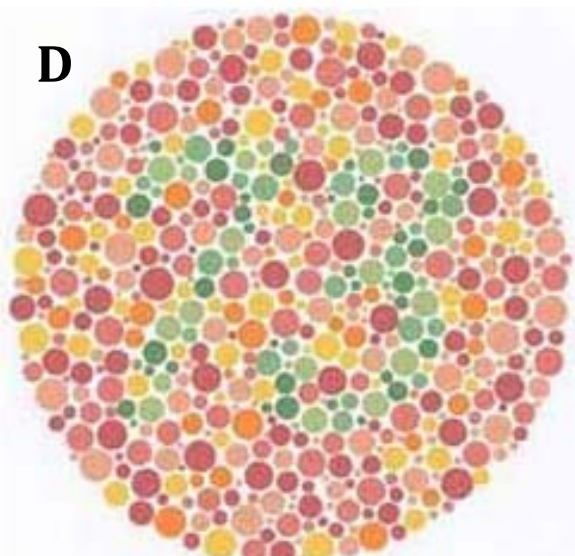
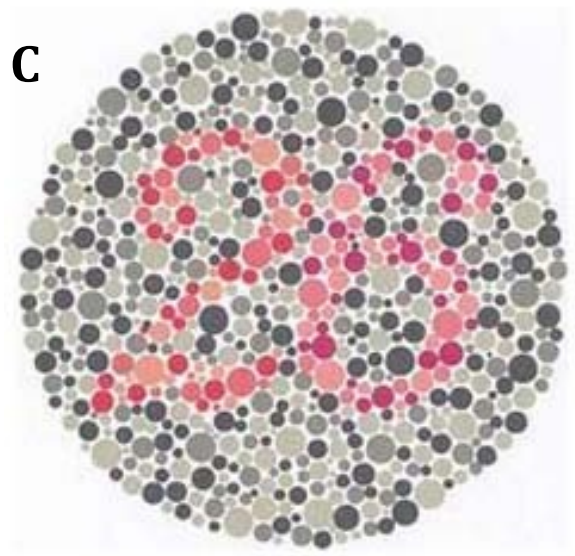
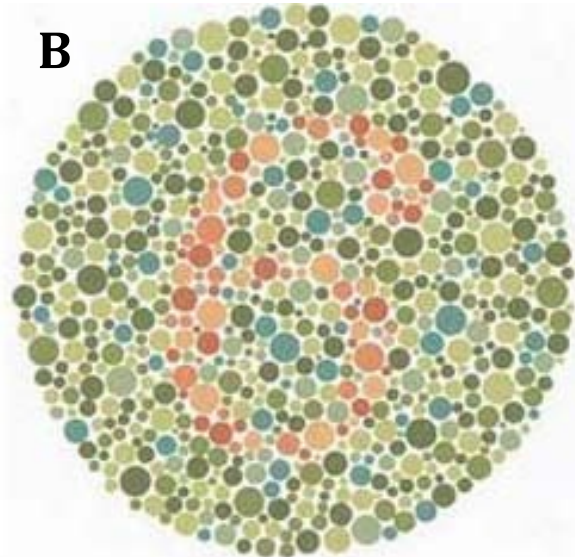
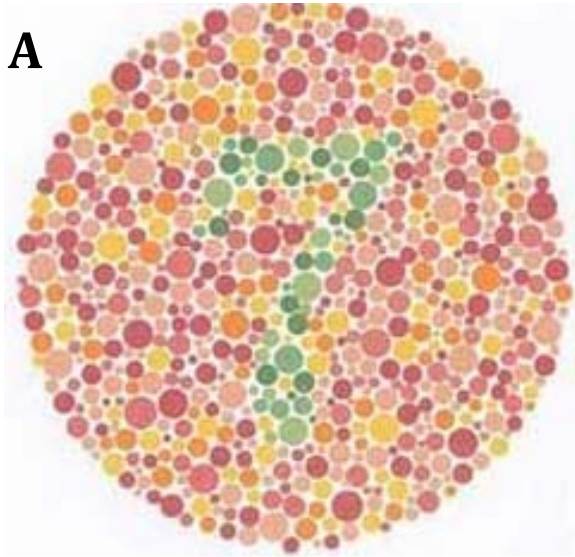
STATION 3: SPINAL CORD



<http://commons.wikivet.net/images/thumb/3/3a/WIKIVETspinalcord1.jpg/350px-WIKIVETspinalcord1.jpg>

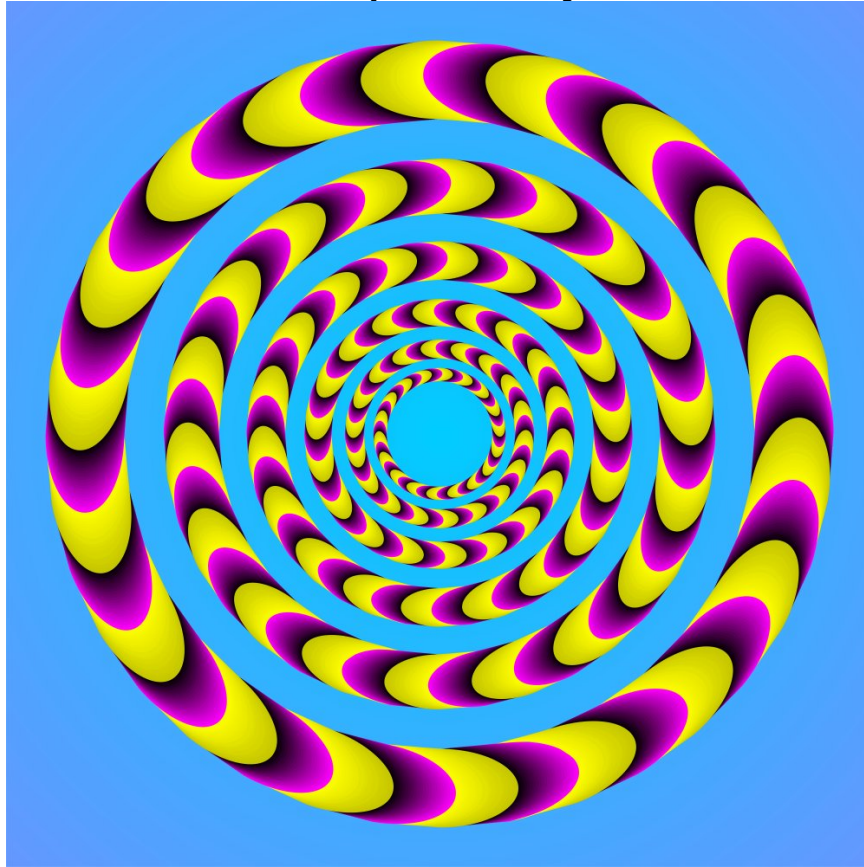
[http://biology.clc.uc.edu/fankhauser/Labs/Anatomy & Physiology/A&P202/CNS Histology/Spinal Cord/sp_cd_jpgs/Spinal Cord_PC271478md.JPG](http://biology.clc.uc.edu/fankhauser/Labs/Anatomy%20&%20Physiology/A&P202/CNS%20Histology/Spinal%20Cord/sp_cd_jpgs/Spinal%20Cord_PC271478md.JPG)

Ishihara Colorblindness Test



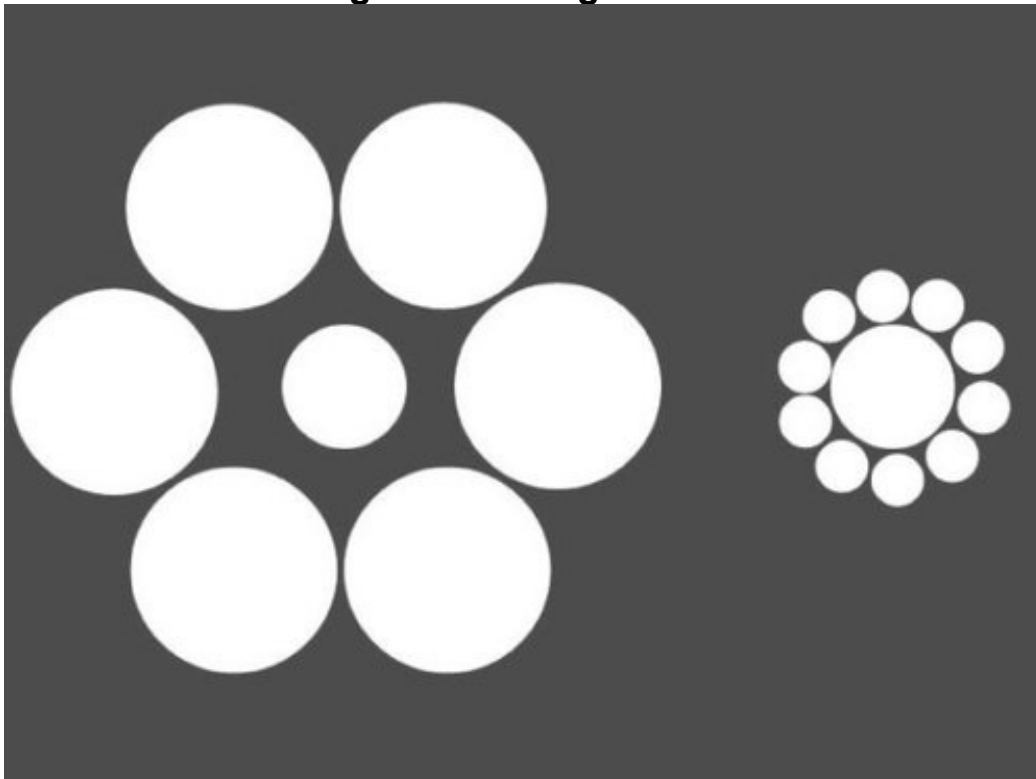
Optical Illusions

A. Focus on the center circle and explain what you see.



<http://imgboat.com/imgs/2012/08/07/kitaoka-optical-illusions-magical-32.jpg>

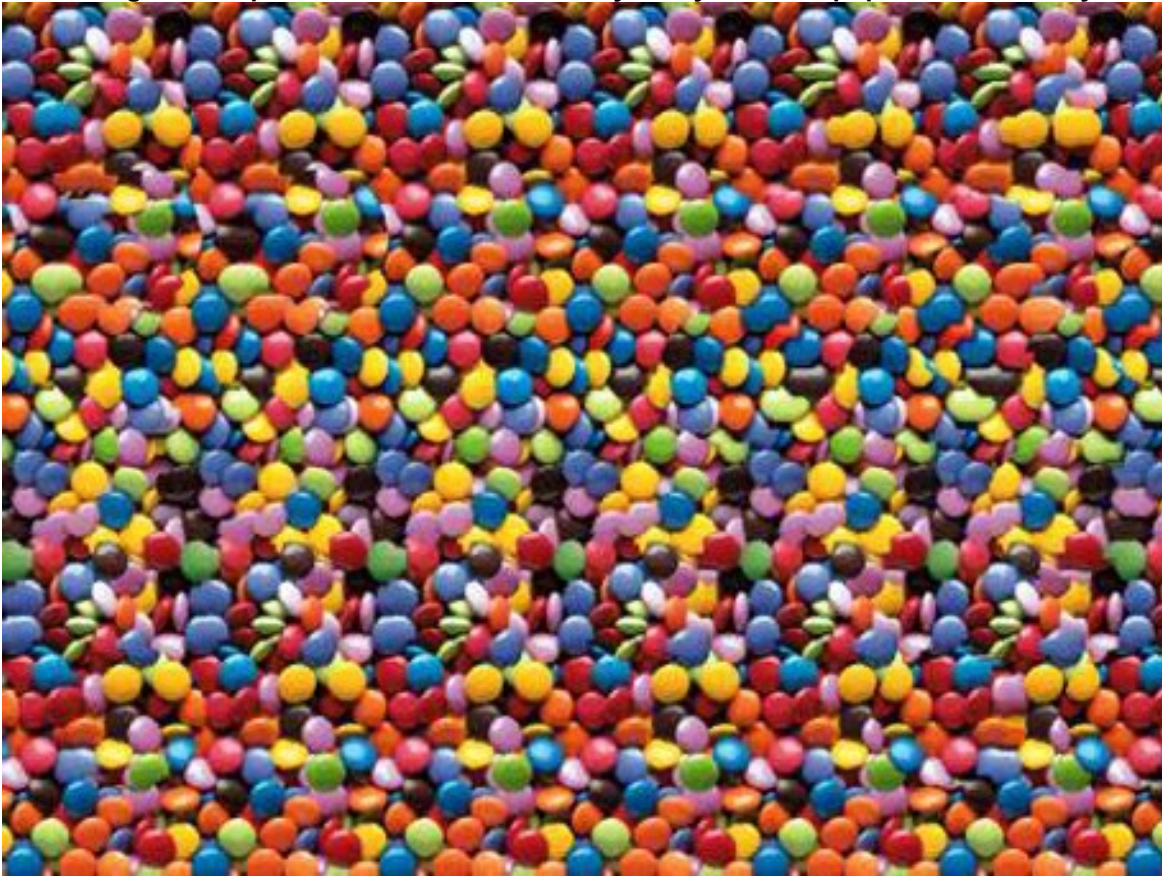
B. Is the center circle on the right or left larger?



http://cache.gawkerassets.com/assets/images/8/2010/12/500x_fig_2.24.jpg

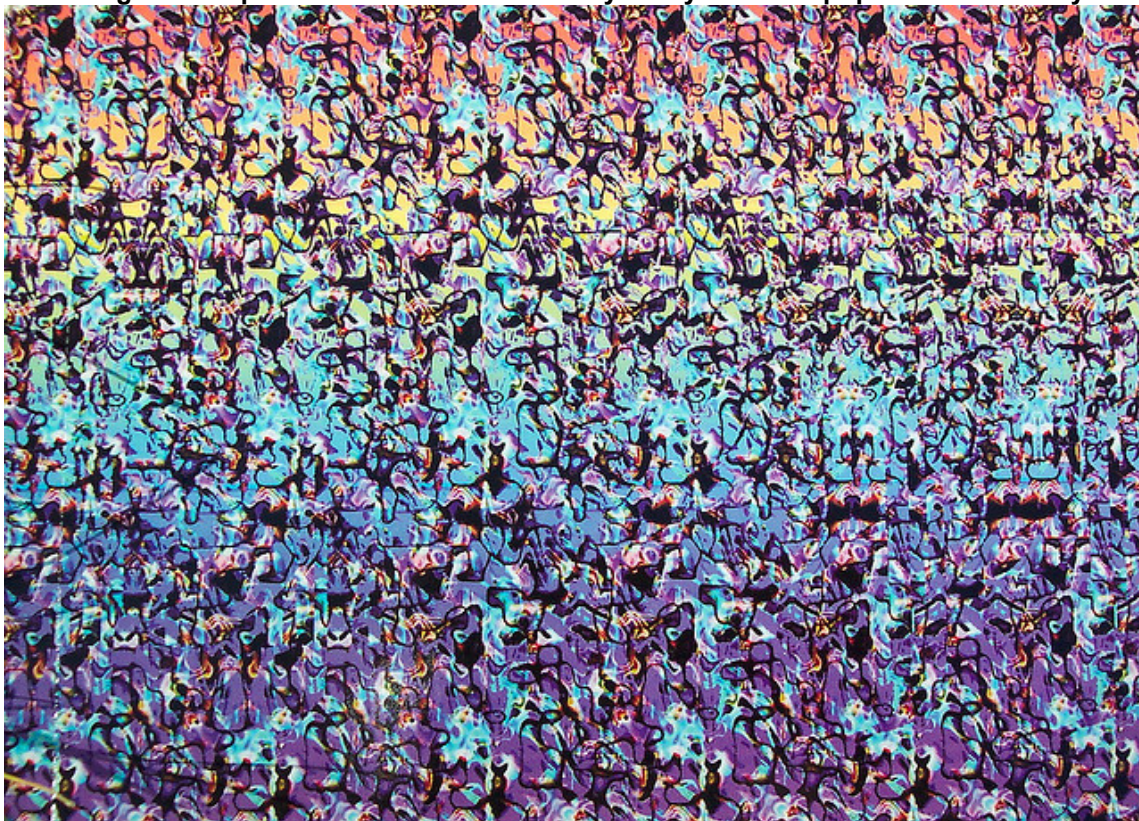
Optical Illusions

C. There is a 3D image in this picture. Focus and unfocus your eyes until it pops out. What do you see?



<http://www.popularvirals.com/images/illusions/optical-illusions-0923.jpg>

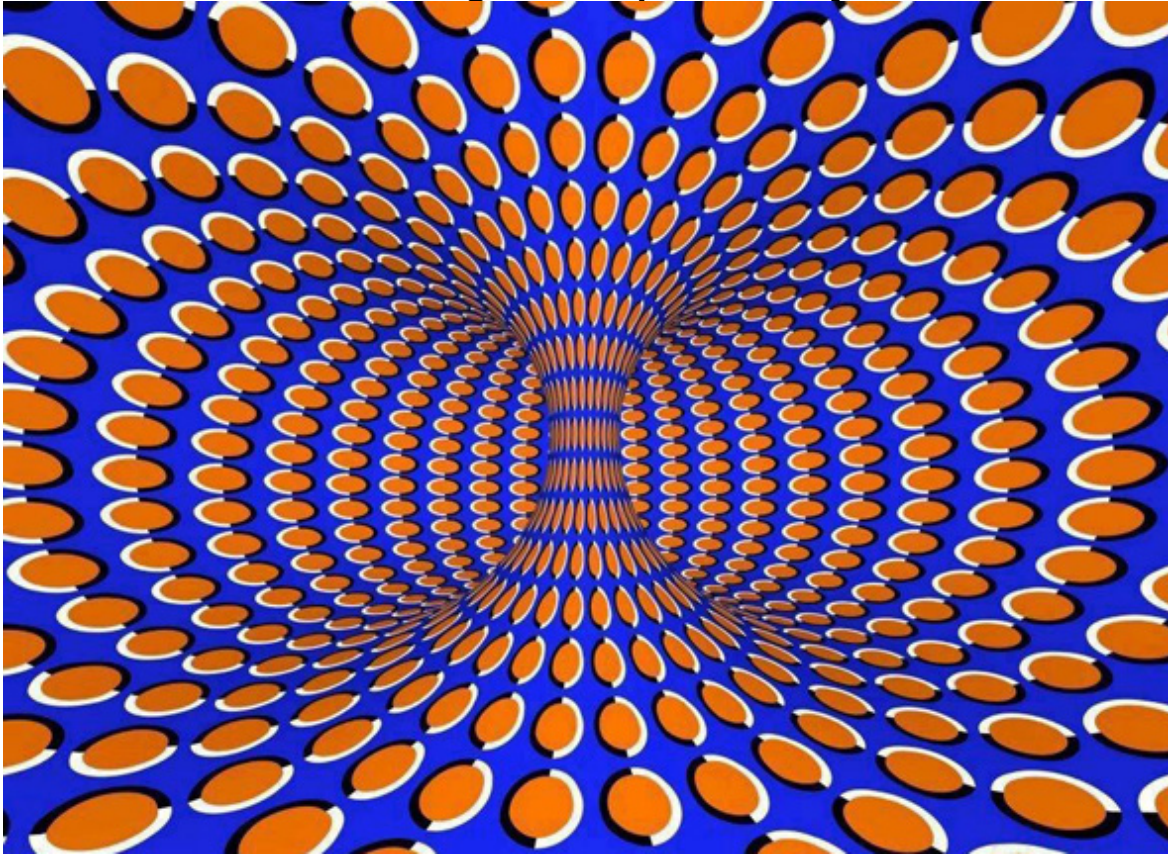
D. There is a 3D image in this picture. Focus and unfocus your eyes until it pops out. What do you see?



http://farm2.staticflickr.com/1117/1068021273_cd9f1a8143_z.jpg

Optical Illusions

E. Focus on the center of the image and explain what you see.



<http://www.moillusions.com/>

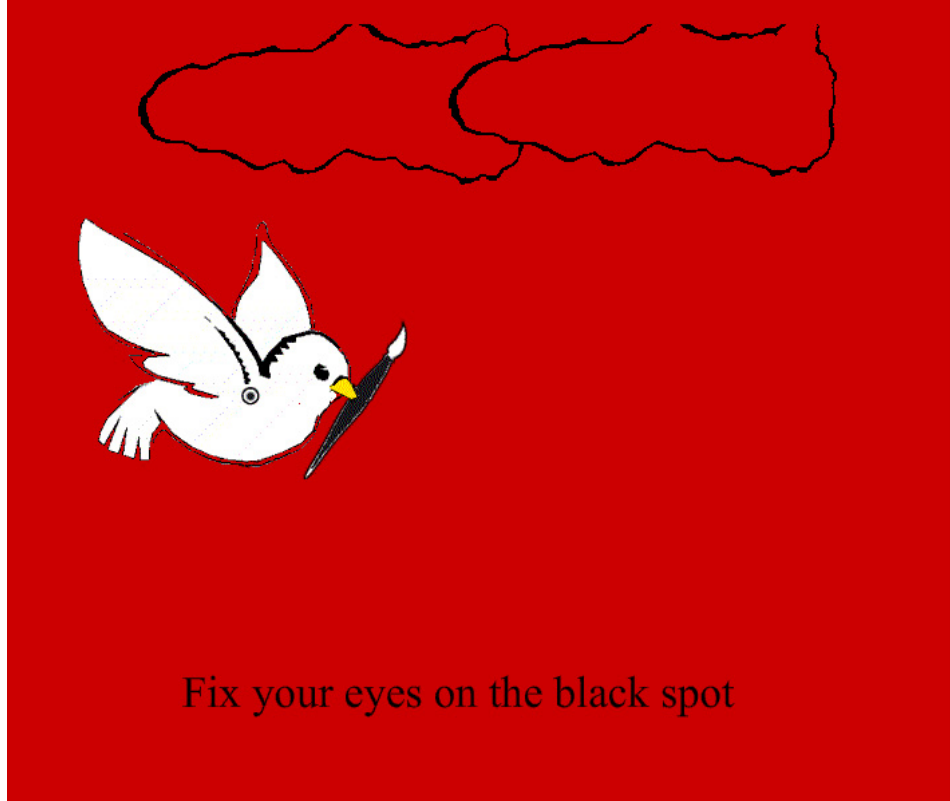
F. How many people are in this image?



<http://www.moillusions.com/>

Optical Illusions

G. Stare at the black spot for 30 sec, then look at a white wall or sheet of paper. Explain what you see.



<http://en.wikipedia.org/wiki/File:Colordove.jpg>

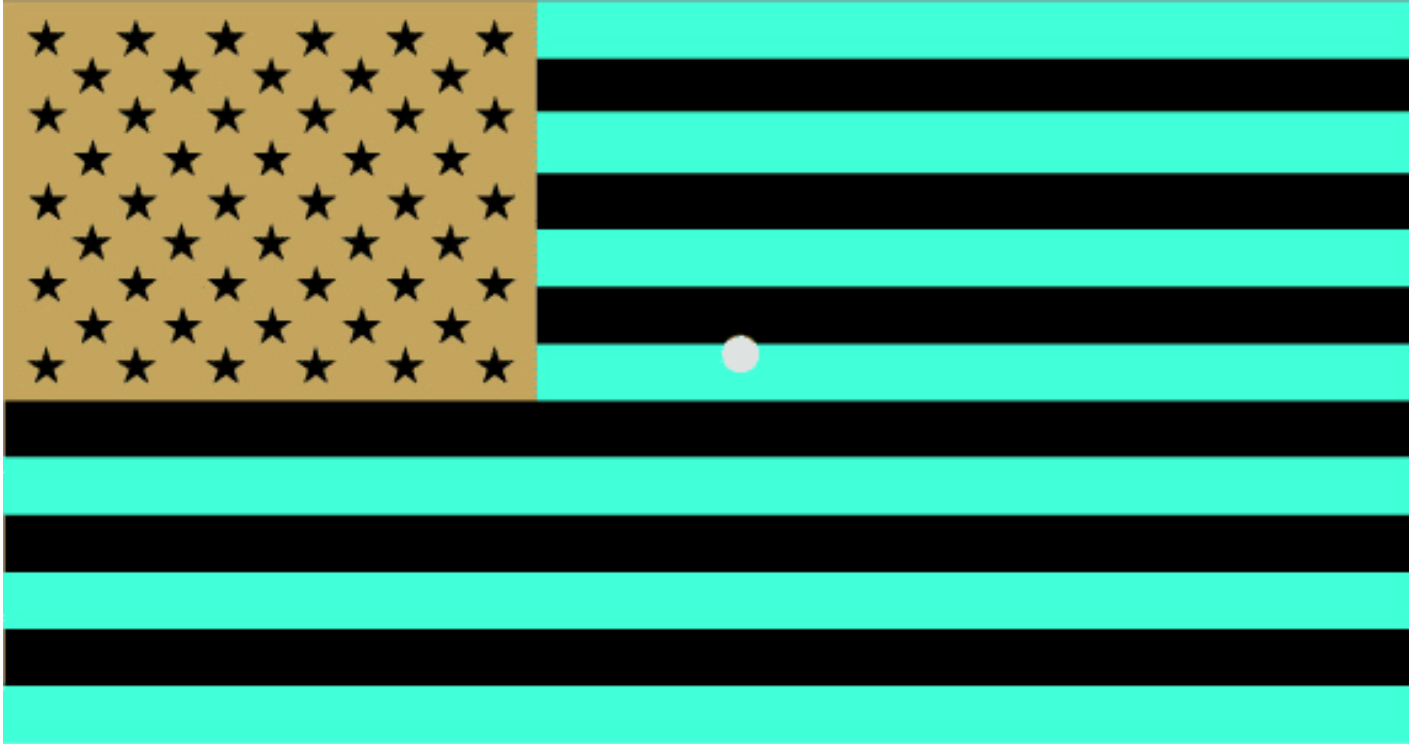
H. Stare at the nose for 30 sec, then look at a white wall or sheet of paper. Explain what you see.



http://wernernekes.de/00_cms/cms/upload/Fotos_Sammlung/Fotos_Glossar/After_Image

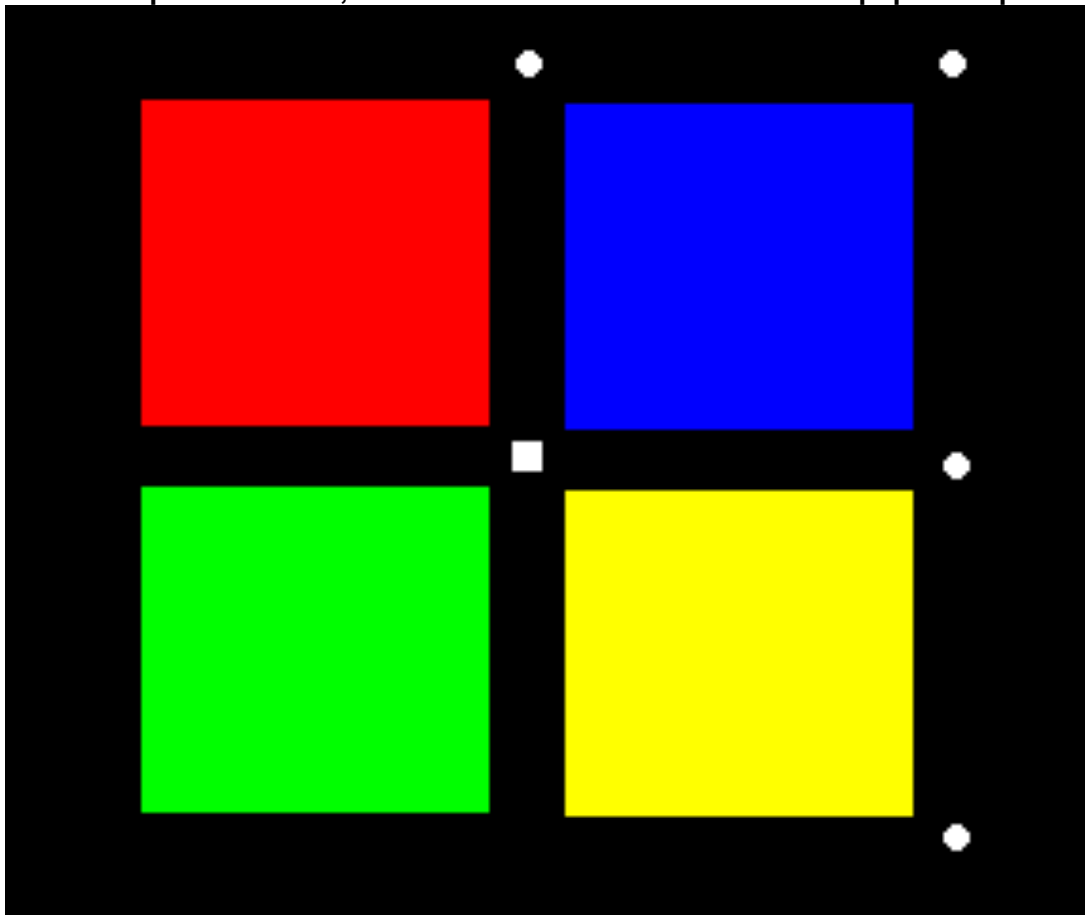
Optical Illusions

I. Stare at the white spot for 30 sec, then look at a white wall or sheet of paper. Explain what you see.













http://www.planetperplex.com/img/afterimage_flag.gif

J. Stare at the center spot for 30 sec, then look at a white wall or sheet of paper. Explain what you see.



<http://www.moillusions.com/>

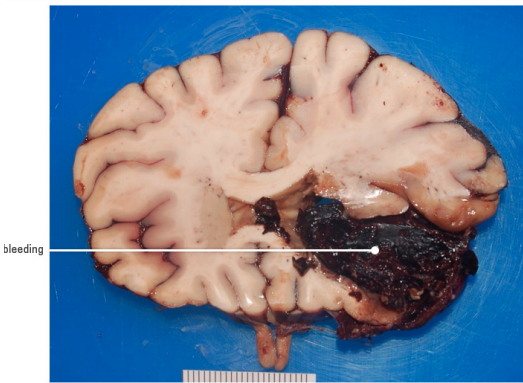
	
	
	
	
	

Station 5: Cerebrovascular Accident (Stroke)

Occurs when blood flow to a portion of the brain is halted

Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Certain types are hereditary • Blood vessel is clogged by plaque or blood clot • Blood vessel bursts • Diabetes • High cholesterol • Increasing age • Unhealthy lifestyle choices 	<ul style="list-style-type: none"> • Severe headache • Change in hearing, taste, touch, or vision • Change in alertness • Loss of coordination & balance • Confusion or memory loss • Muscle weakness or numbness (usually one-sided) 	<ul style="list-style-type: none"> • Hospitalization • Blood clot = clot busting drugs (thrombolytics) • Blood thinners • Surgery to open clogged vessel • Surgery to repair vessels • Stroke rehabilitation

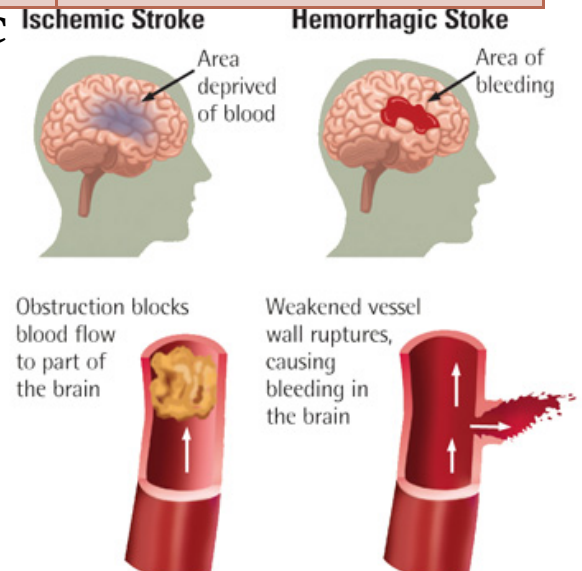
A



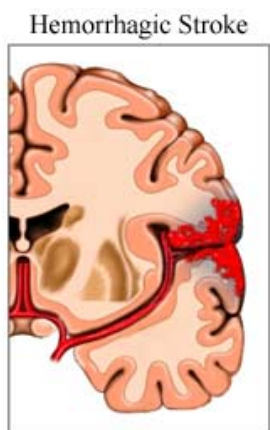
B



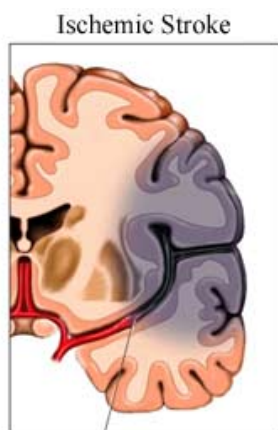
C



D

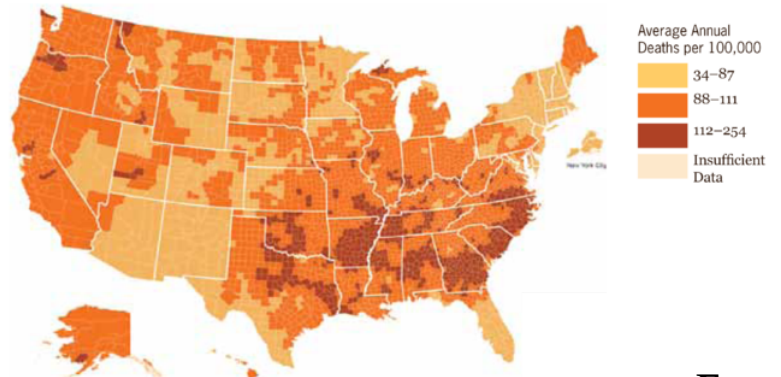


Hemorrhage/blood leaks into brain tissue



Clot stops blood supply to an area of the brain

Stroke Death Rates 2002-2007, Adults Ages 35+, by County



<http://apps.nccd.cdc.gov/GISCVH2/>

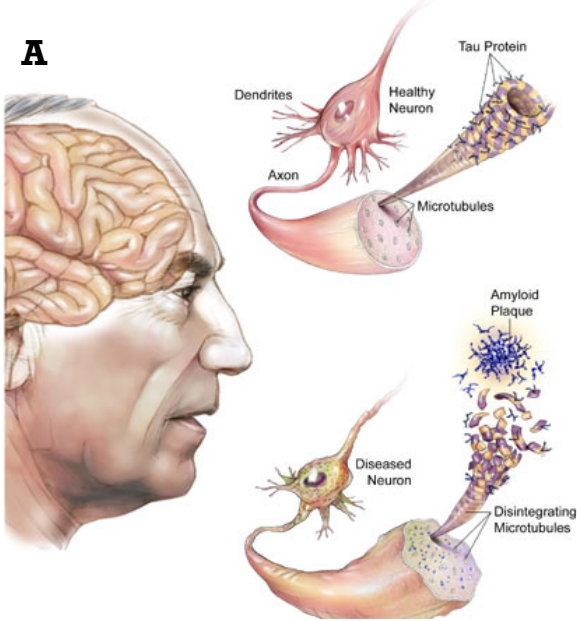
E

- http://floydmemorial.com/wp-content/uploads/2011/05/different_types_of_strokes.jpg
- <http://news.wustl.edu/news/PublishingImages/StrokeScan.jpg>
- http://upload.wikimedia.org/wikipedia/commons/thumb/a/a7/Stroke_Death_Rates_2002-2007_Adults_35%2B_by_county_US.png/640px-Stroke_Death_Rates_2002-2007_Adults_35%2B_by_county_US.png
- <http://www.beliefnet.com/healthandhealing/images/si55551195.jpg>
- http://vista.engines4ed.org/medicalDetective/case_2_herren/task_2/task2.4/docs/images/macrosopic/19-stroke-bleeding-secI.jpg

Station 5: Alzheimer's Disease

A form of dementia associated with age

Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Hereditary • Family history • Age: over 60 • High insulin levels • Past head trauma 	<ul style="list-style-type: none"> • Memory loss • Confusion & disorientation • Mood & behavior changes • Difficulty performing everyday functions • Unfounded suspicions • Difficulty speaking, swallowing, and/or walking 	<ul style="list-style-type: none"> • Uncurable • Medication • Removing behavior triggers • Psychological coping skills • Herbal therapies • Stem cells



Alzheimer's disease

B

How it happens

- 1 Clumps of protein (amyloid plaques and tau tangles) grow in brain
- 2 Protein strands twist, damaging brain cells (neurons)
- 3 Brain cells die, certain areas of brain shrink

Age 65 and up at risk; could affect younger people

Sources: AFP/ADI/NIA/MC

070909 AFP

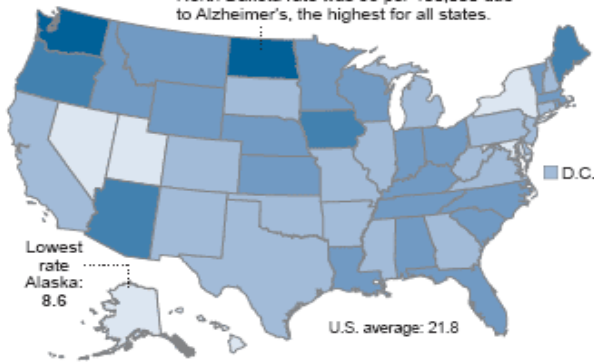
Alzheimer's affects aging population

One in eight people age 65 and older have Alzheimer's disease, a recent study found.

Alzheimer's death rate, per 100,000 in 2003

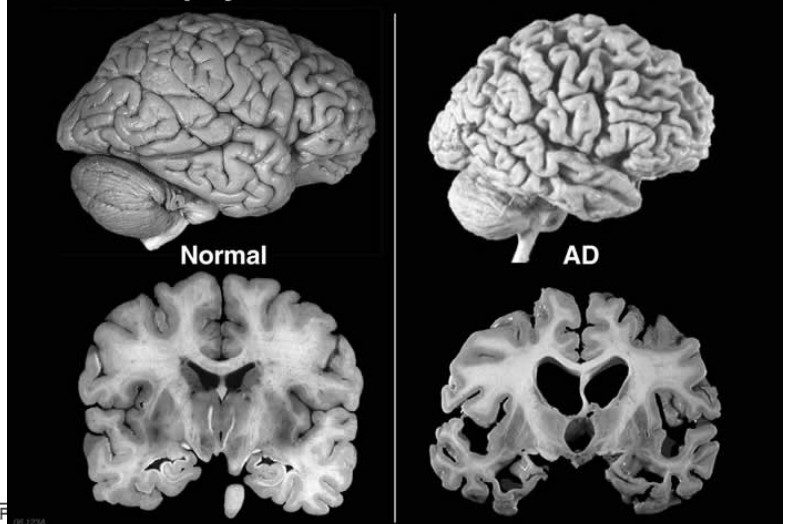


North Dakota rate was 53 per 100,000 due to Alzheimer's, the highest for all states.



SOURCE: Alzheimer's Association

Brain Atrophy in Advanced Alzheimer's Disease



A. <http://sierram.web.unc.edu/files/2011/04/Alzheimers-disease.jpg>

B. <http://www.medindia.net/health-infographics/images/alzheimers-disease1.jpg>

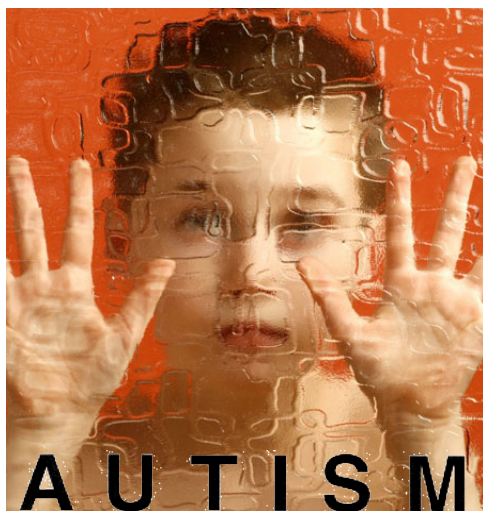
402 C. <http://www.papermasters.com/images/alzheimers-disease-term.jpg>

Station 5: Autism

Brain disorder that makes it difficult to communicate

Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Cause is not well understood • Family history • Hereditary • Mostly males • Environmental • Past medical issue 	<ul style="list-style-type: none"> • Delay in learning to talk/non-communicative • Repeated behaviors • Unusual attachment to object or routine • Anxiety • Depression 	<ul style="list-style-type: none"> • Medication • Coping skills • Specialized therapy • Behavioral management • Anxiety management

A

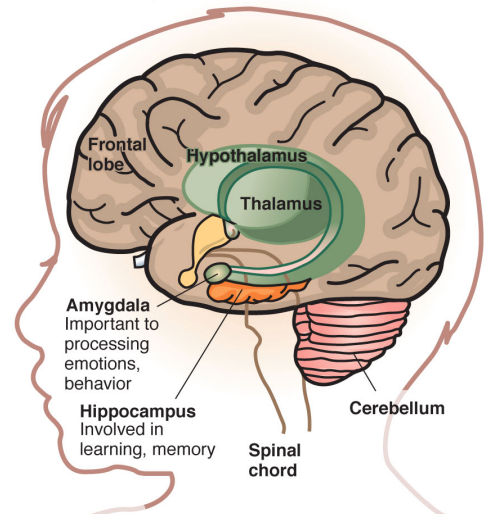


Persons with autism may possess the following characteristics in various combinations and in varying degrees of severity.

B

Autism and the brain

The areas of the brain affected by autism, which stems from abnormal brain development:



Affect on brain cells (neurons)

- Cells are smaller, more densely packed in certain areas
- Have shorter, less developed branches

C

- Inappropriate laughing or giggling
- No real fear of dangers
- Apparent insensitivity to pain
- May not want cuddling
- Sustained unusual or repetitive play; Uneven physical or verbal skills
- May avoid eye contact
- May prefer to be alone
- Difficulty in expressing needs; May use gestures
- Inappropriate attachments to objects
- Insistence on sameness
- Echoes words or phrases
- Inappropriate response or no response to sound
- Spins objects or self
- Difficulty in interacting with others

Identified Prevalence of Autism Spectrum Disorders **D**

ADDM Network 2000-2008
Combining Data from All Sites

Surveillance Year	Birth Year	Number of ADDM Sites Reporting	Prevalence per 1,000 Children (Range)	This is about 1 in X children...
2000	1992	6	6.7 (4.5-9.9)	1 in 150
2002	1994	14	6.6 (3.3-10.6)	1 in 150
2004	1996	8	8.0 (4.6-9.8)	1 in 125
2006	1998	11	9.0 (4.2-12.1)	1 in 110
2008	2000	14	11.3 (4.8-21.2)	1 in 88

A. http://theloquitur.com/wp-content/uploads/2012/04/AUTISM_brainInfographic2.jpg

B. http://www.cdc.gov/ncbddd/autism/images/autism_data_graphic2012.jpg

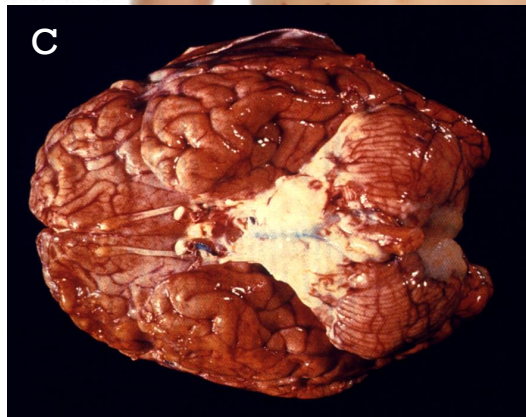
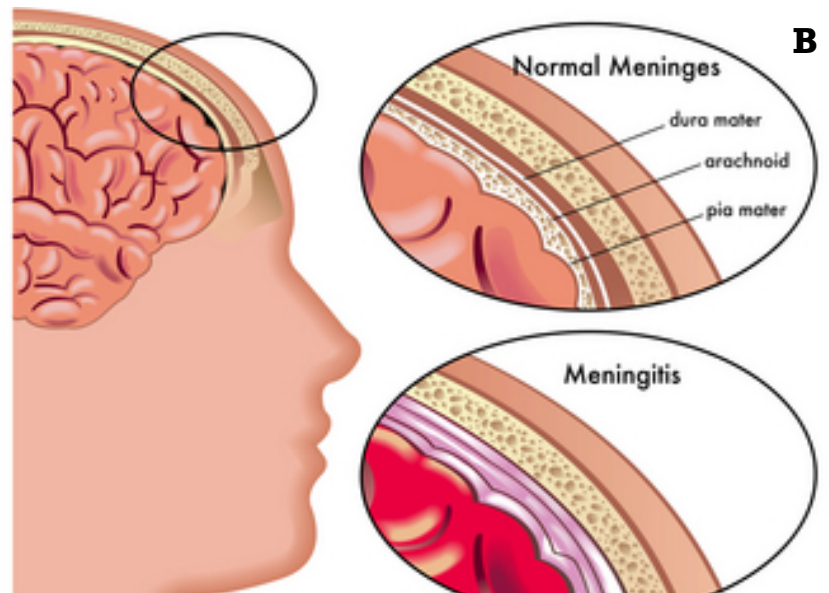
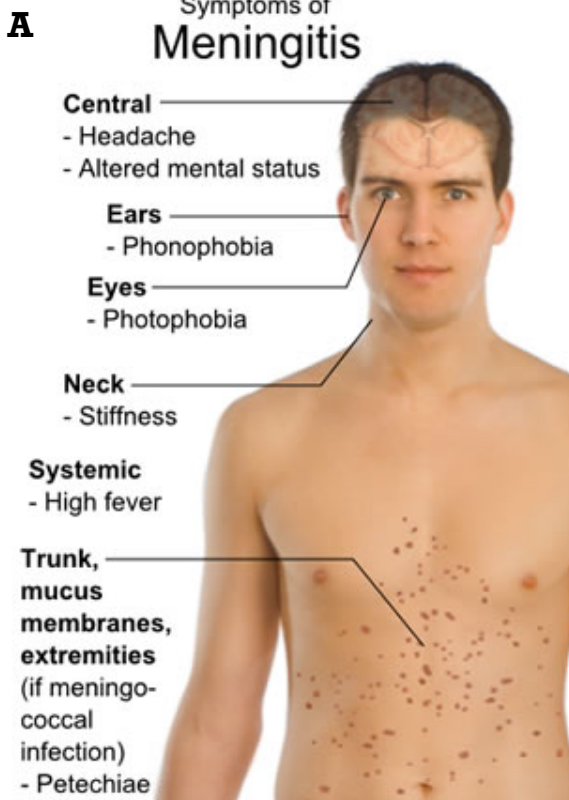
C. http://www.naturalguidetohealth.com/sitebuilder/images/Autism_Spectrum_Disorder-2_1_-527x600.png

D. <http://www.rodale.com/files/images/slideshow2/causes-of-autism-450.jpg>

Station 5: Meningitis

Infection in the meninges surrounding the brain

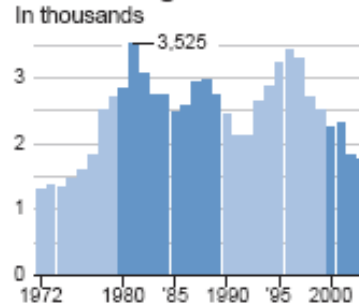
Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Bacteria or viral infection • Drug allergies • Fungi or parasites • Chemical irritations • Tumors 	<ul style="list-style-type: none"> • Nausea & vomiting • Sensitivity to light • Fever & chills • Mental status change • Stiff neck • Severe headache • Irritation 	<ul style="list-style-type: none"> • Bacterial - hospitalization • Antibiotics • Medication to treat symptoms • Prevention with vaccination



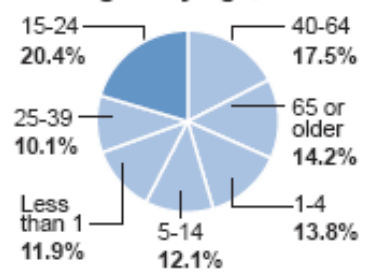
Meningitis cases

On average meningitis affects only thousands of people nationwide each year. People between the ages of 15-24 account for one fifth of all cases.

U.S. Meningitis cases



Meningitis by age, 2003



NOTE: 21 patients did not give their age

SOURCE: Centers for Disease Control and Prevention

AP

A. http://www.news-medical.net/image.axd?picture=2012%2F10%2FSymptoms_of_Meningitis..jpg

B. <http://www.myhealthnewsdaily.com/images/i/1943/iFF/brain-meninges-meningitis-121008.jpg?1349710354>

C. http://msnbcmedia3.msn.com/i/msnbc/Components/Art/HEALTH/050526/Chart_Meningitis1.gif

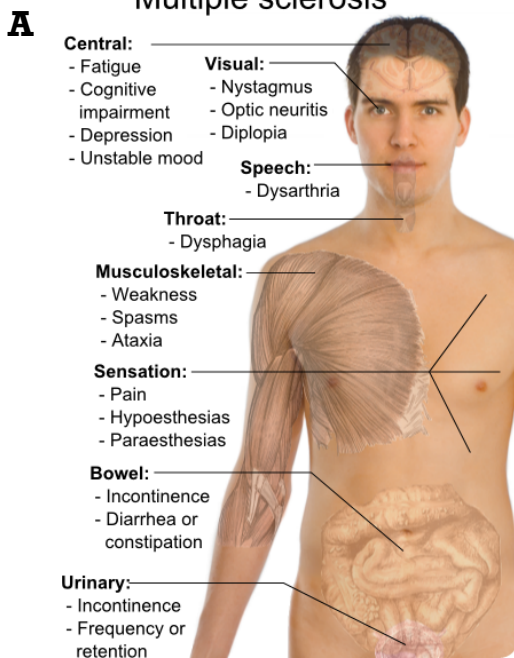
D. <http://pathmicro.med.sc.edu/infectious%20disease/s%20pneumoniae%20meningitis.jpg>

Station 5: Multiple Sclerosis

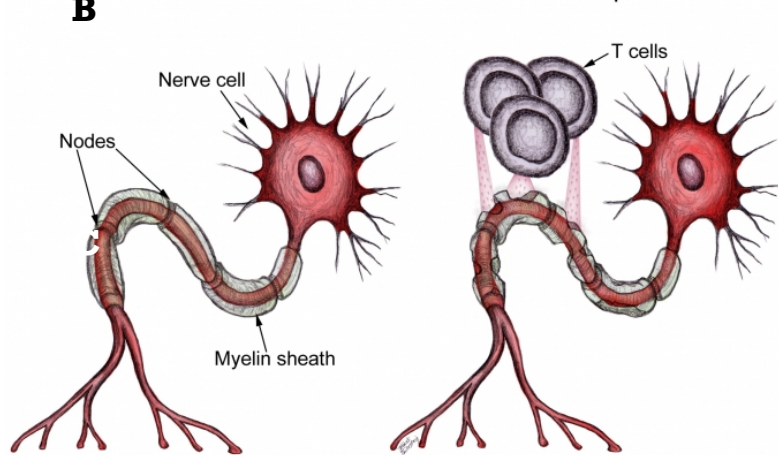
Autoimmune disease that damages the myelin sheath

Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Cause not well understood • Hereditary • Family history • Diagnosed between 20-40 • Nerve damage caused by inflammation • Possibly viral infection • Environmental factors 	<ul style="list-style-type: none"> • Vary depending on location & severity • Muscle weakness, spasms, tremors, & numbness • Incontinence & frequent urination • Constipation & stool leakage • Vision & hearing loss • Depression, dizziness, fatigue, & memory loss 	<ul style="list-style-type: none"> • No known cure • Medications to slow disease progress • Steroid treatments • Physical therapy • Assistive devices • Healthy lifestyle choices

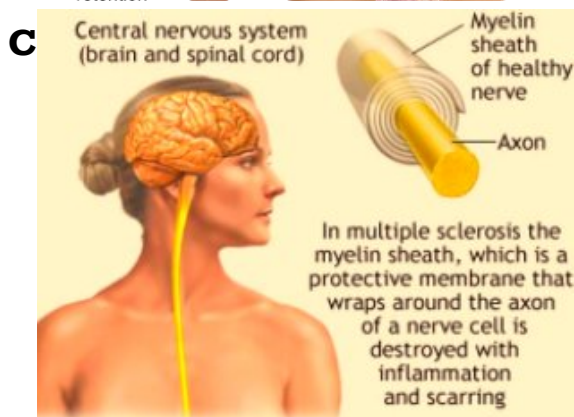
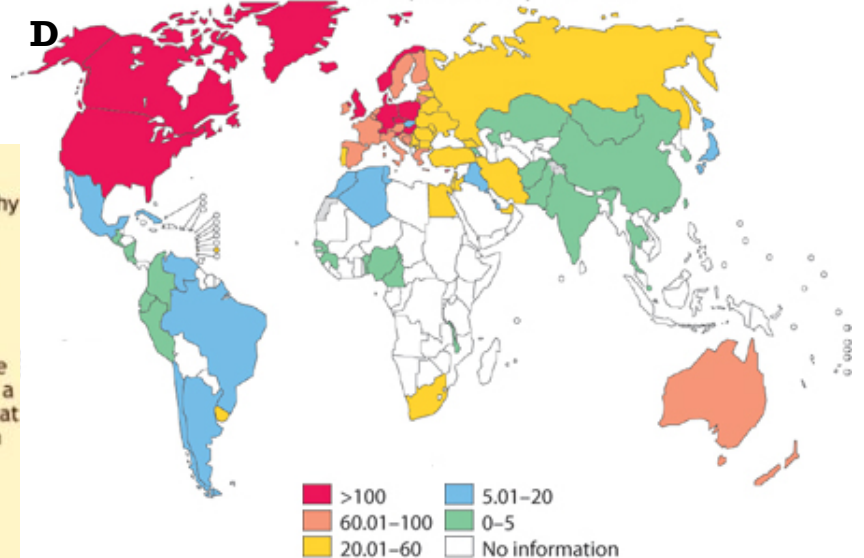
Main symptoms of Multiple sclerosis



B Normal nerve Nerve in multiple sclerosis



Prevalence of Multiple sclerosis (per 100 000)

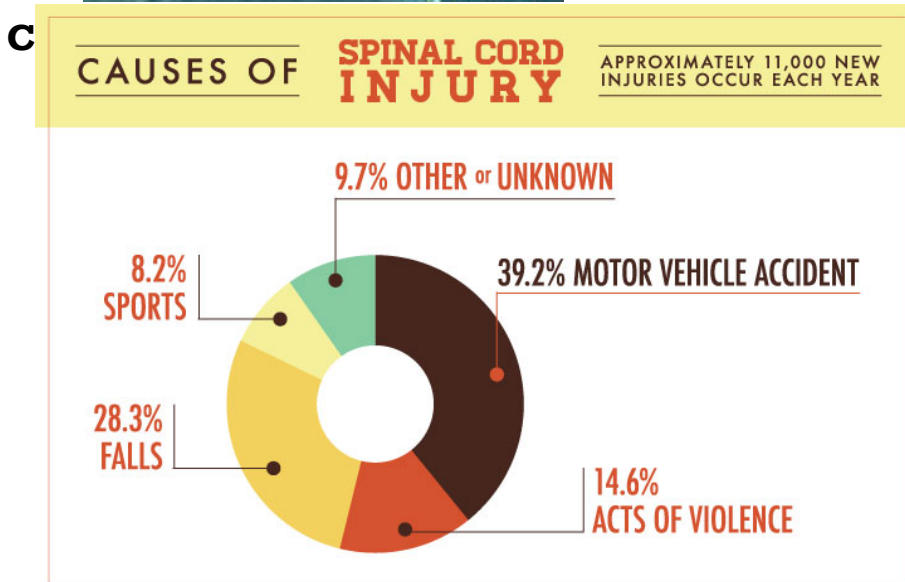
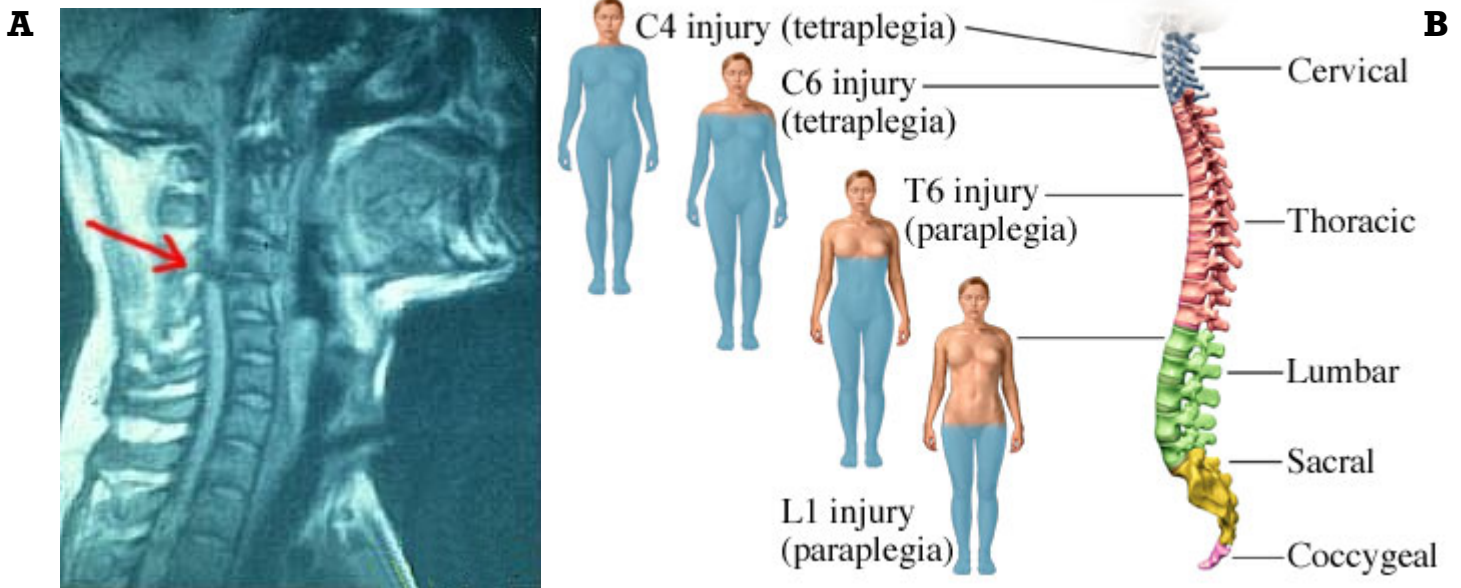


- A. http://www.news-medical.net/image.axd?picture=Symptoms_of_multiple_sclerosis.png
- B. <http://probioticsnow.com/images/global%20ms.jpg>
- C. <http://www.inflammation-information.com/images/Multiplesclerosis17089.jpg>
- D. http://www.sos03.com/files/styles/health_images/public/Multiple%20Sclerosis.jpg

Station 5: Spinal Cord Trauma

Damage to the spinal cord

Causes & Risk Factors	Symptoms	Treatment Options
<ul style="list-style-type: none"> • Direct injury or disease • Assault, fall, accident • Weakened vertebral column • Fluid build-up around spinal cord • Most common in men ages 15-35 	<ul style="list-style-type: none"> • Weakness • Loss of feeling below damaged site • Spastic muscles • Loss of bladder & bowel control • Pain and/or numbness • Paralysis 	<ul style="list-style-type: none"> • Completely severed spinal cord cannot be cured • Medication to reduce swelling • Surgery • Bed rest • Spinal traction • Physical therapy



- A. <http://www.michaelwaks.com/images/Spinal-Cord-Injury-Attorney.jpg>
- B. https://ufandshands.org/sites/default/files/media/Health-Images/Spinal_Cord_Injury_MRI.jpg
- C. http://thumbnails.visually.netdna-cdn.com/spinal-cord-injury_506dbac98981e.jpg
- D. http://www.mentalfloss.com/wp-content/uploads/2009/02/LTWT_WHEELCHAIR_LRG.jpg

.28 s	.28 s	.28 s	.28 s	.28 s	.28 s
.27 s	.27 s	.27 s	.27 s	.27 s	.27 s
.26 s	.26 s	.26 s	.26 s	.26 s	.26 s
.25 s	.25 s	.25 s	.25 s	.25 s	.25 s
.24 s	.24 s	.24 s	.24 s	.24 s	.24 s
.23 s	.23 s	.23 s	.23 s	.23 s	.23 s
.22 s	.22 s	.22 s	.22 s	.22 s	.22 s
.21 s	.21 s	.21 s	.21 s	.21 s	.21 s
.20 s	.20 s	.20 s	.20 s	.20 s	.20 s
.19 s	.19 s	.19 s	.19 s	.19 s	.19 s
.18 s	.18 s	.18 s	.18 s	.18 s	.18 s
.17 s	.17 s	.17 s	.17 s	.17 s	.17 s
.16 s	.16 s	.16 s	.16 s	.16 s	.16 s
.15 s	.15 s	.15 s	.15 s	.15 s	.15 s
.14 s	.14 s	.14 s	.14 s	.14 s	.14 s
.13 s	.13 s	.13 s	.13 s	.13 s	.13 s
.12 s	.12 s	.12 s	.12 s	.12 s	.12 s
.11 s	.11 s	.11 s	.11 s	.11 s	.11 s
.10 s	.10 s	.10 s	.10 s	.10 s	.10 s
.09 s	.09 s	.09 s	.09 s	.09 s	.09 s
.08 s	.08 s	.08 s	.08 s	.08 s	.08 s
.07 s	.07 s	.07 s	.07 s	.07 s	.07 s
.06 s	.06 s	.06 s	.06 s	.06 s	.06 s
.05 s	.05 s	.05 s	.05 s	.05 s	.05 s
.04 s	.04 s	.04 s	.04 s	.04 s	.04 s

