**Normal Reading Processes:**
- reading can be achieved in 2 ways:
  - whole word
  - Phonetic

**Surface Dyslexia:**
- deficit in whole word reading
- damage to left lateral temporal lobe

**Phonological dyslexia:**
- deficit in reading unfamiliar words, non-words
- damage to left frontal lobe

**Neurological disorders:**
- Tumors: growth of non-functional cells
  - *benign*: cells grow w/i their own membrane/clear boundaries
  - *malignant*: no border between cell and tissue, cancerous, infiltrating tumor
- **metastic**: cells coming from malignant tumors in other organs that reach the brain and develop
- damage is caused by compression and infiltration
- because neurons cannot divide they are NOT responsible for tumors
- **Cause of tumors**:
  - **Gliomas (glial cells)**: malignant, can be removed surgically and radiation
  - **Meningiomas (from dura mater)**: bening, can be treated with surgery
  - malignant & benign -> compression
  - malignant -> take up space, use up oxygen/glucose, destroy cells
- **Seizure disorders**: uncontrollable spread of neural activity (excitatory)
- sometimes leads to convulsions
- **Epilepsy**: recurring seizures
- **Partial seizures (focal & remain local) vs. generalized seizures**
  - Partial seizures can be simple (no loss of consciousness) or complex
  - **Grand mal**: generalized seizure w/ convulsion

<table>
<thead>
<tr>
<th>Aura</th>
<th>Tonic Phase</th>
<th>Clonic Phase</th>
<th>Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>secs</td>
<td>15 secs</td>
<td>30 secs</td>
<td>min/hrs</td>
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</table>

- **Petit mal**: absence seizures (generalized complex)
  - stop of activity (secs) unconscious
  - GABA- inhibits excitatory chemicals
- Primary damage in the temporal lobe (HC- Hippocampus)
- **Status epilepticus**: repeated complex seizures w/o regaining consciousness
  - temporal lobe seizures usually experience religious/spiritual emotions.
- **Excitotoxicity**: neuron death caused by too much excitation through NMDA channels
- **Treatments**:
  - anticonvulsants: benzodiazepines, barbituates
  - surgery (side effects: remember, HC?)
  - vagus nerve stimulation (partial seizures)

- **Stroke**: cerebrovascular accidents
- **hemorrhagic**: bleeding in the brain
- **Ischemia**: blood clot, loss of blood flow
  - **Hypoxia** -> shortage of oxygen prevented by aspirin
  - **Thrombus & embolus** -> loss of oxygen & glucose, osmolarity variations
    - Thrombus: blood vessel obstruction/clot
    - Embolus: clot that travels through blood stream
- Permanent brain damage can be prevented:
  - medications to reduce blood pressure
  - brain surgery
- antibiotics (embolus & bacterial infections)
- anticoagulant; prevent blood clot up to 9hrs after stroke

**Causes:**
- Plaques: atherosclerosis build up of material on walls of blood vessels
- detected by angiography x ray of blood circulation
- treated by surgery

**Rehabilitation after stroke:**
- therapies depend on the type of brain damage
- case of limb movement impairment
  - constraint: induced therapy, inducing brain plasticity by artificially amputating/restricting movement in good limb
- brain-machine interface: linking neural activity to an external artificial device
  - perception: artificial device
  - motor: artificial hand/arm

**Developmental disorders:**
- generally induced by viruses or drugs
- result in non-viability or retardation
  - *fetal alcohol syndrome*: affects axonal growth & synaptic plasticity (LTP/LTD)
    - low doses of alcohol during pregnancy are sufficient

**Inherited Metabolic disorders:** deficiency in the production of an enzyme, genetic basis
- PKU: deficit in phenylalanine -> tyrosine conversion
  - lack of myelination
- lack of vitamin B6: damage to thalamus & cerebellum
- lack of glucose(milk) metabolism: damage to cerebellum and cortex
- *Tay-Sachs disease*: inability to break down cellular waste products
  - accumulation of waste, brain swelling, death
  - retinal diagnosis

**Down syndrome:** congenital (born w/)
- extra chromosome 21 from mother
- 10% less brain
- less neurons in frontal lobe & wenicke’s area
- mild to severe retardation
- **no cure**