Medications and Cognition

The rehabilitation therapist should be knowledgeable about Meds
- The actions and side effects of medications:
  - can have a direct effect upon the success of dementia assessment
  - can have a direct effect on success of rehab
    - Affect dysphagia and nutritional status
    - Affect movement
    - Affect learning and cognition
  - Medications may cause:
    - xerostomia and swallowing difficulties
    - movement disorders, fatigue, muscle incoordination
    - sedation and impaired cognition
- Make friends with your pharmacist

Medications have optimal times when they are most effective after administration.
- If Sinemet CR is given at 8 AM, 8:30 AM would not be optimal time for rehabilitation.
- Frequently patients seen according to the therapist’s schedule without consideration for optimal medication effects
- Treatment should be sensitive to the positive and negative changes of medication effects
- Whirlpool treatment preceding therapy may result in hypotension, impaired cognition, fall risk
Physical illness such as infection, hypoglycemia, dehydration, and electrolyte imbalance can present as impaired cognition or agitation.

The patient’s medication regimen may also result in misdiagnosis of dementia.

Side effects of medications and medication induced delirium have many of the same symptoms as dementia.

Impairment of cognitive skills due to medication needs to be ruled out in dementia assessment.

**Medications and misdiagnosis**

A.B. is a 70-year-old female with a past medical history of atrial fibrillation and seizures. A.B. is retired and likes to garden and ballroom dance.

Her physician has started her on the antipsychotic medication Geodon for new symptoms of agitation.

After 2 weeks of therapy A.B. is no longer agitated but is no longer participating in her favorite activities, as she is afraid of falling and is tired all of the time.

Question—What other causes of agitation should be ruled out before starting an antipsychotic agent?

Question—How should A.B.’s therapy be altered?

**Patient Case: Antipsychotic Therapy**

Over 50% of individuals over 65 take at least 3 medications on a regular basis. Multiple medications can either accentuate or diminish medication effect and subsequent response in therapy.

Over-the-counter drugs and herbals also should be considered.

They can complicate the picture and may compromise the physician’s treatment plan for the patient as well as affecting the patient’s response to rehabilitation.

**Polypharmacy—A Common Problem**
United States citizens consume 75% of all manufactured medications. We are however 37th in overall health compared to other countries. Taking several medications can result in serious side effects and can result in agitation, sedation, dystonia, hallucinations, and seizures.

Study of elderly/dementia – patients took an average of 15 medications. In many cases, medications no longer required. Common medications no longer required include iron, proton pump inhibitors and antihypertensive medications. Elderly patients may become confused due to effects of multiple medications combined with hearing, vision, and cognitive difficulties. These difficulties can lead to non-adherence and failed medication therapy.

Adverse drug reactions and Drug Interactions
Adverse drug reactions
ADRs also can play an important role in the patient’s response to treatment. The clinician needs to be aware of the side effects and drug interactions in the patient’s medications and how these interactions affect treatment. This is particularly true in the elderly patient with dementia. Many dementia patients receive other medications that can result in changes in cognition and a reduction in dementia medication therapeutic effects.

ADRs Caused By Drug Combinations
- The combination of antidepressants such as Prozac and Valium can lead to decreased Valium clearance and increased sedation.
- Decreased Valium clearance can also be found with the combination of Valium and antacids such as Tagamet.
- The combination of Xanax and oral contraceptives can result in decreased Xanax clearance as well as increased sedation.

Medications in the demented elderly—Why is this important?
- Multiple health problems exacerbate the situation.
- The elderly are not as efficient in metabolizing and excreting medications.
- As patients age there is a change in body composition—less protein, more fat.
- More side effects—reduction in dose, titration needed
- Start low and go slow with initiation and titrating new meds in these patients.
Medications in the demented and elderly population

- Decreases in motor coordination, reaction time, brain mass and central blood flow changes result in less efficient short term memory --- the bigger the medication dose the higher the risk for altered mental status
- Medications associated with changes in cognition include antipsychotics (Haldol), antidepressants (Elavil), pain meds (morphine), muscle relaxants (Valium), anticholinergics (Benadryl), antiseizure medications (Neurontin), diabetes meds (insulin) and alcohol

Medications and sedation

- Medications such as benzodiazepines (Xanax), antipsychotics (Risperdal), pain medications (Norco), antidepressants (Paxil) and anticholinergics (scopolamine) are associated with sedation that affects dementia assessment as well as treatment success.
- The sedation usually occurs within the 1st week and generally disappears when the patient develops tolerance to the medication.

Medications and sedation

- This drowsiness has a direct effect upon cognition. If the sedation continues after 1–2 weeks the physician should consider changing the medication or changing the dosage.
- It is also possible the patient is suffering from drug interaction. What is drug interaction?
Drug interactions

- Drug interactions occur when the action of one medication interferes with the action of another medication.
- **Antagonism** occurs when the action of one medication is reduced by the action of another medication.
- Drug interaction between the antianxiety medication BuSpar and the antidepressant Prozac will result in decreased effects of the Prozac.

Drug interactions

- **Potentiation** occurs when the action of one medication is increased by the action of another medication.
- Potentiation occurs with the combination of the anticonvulsant Tegretol and the antidepressant Prozac.

Neurotransmitters and neuromuscular function

- Chemical messengers of the nervous system
- Mediate neurotransmission and control voluntary and involuntary muscles, brain function, behavior, cognition and learning
- Software of the system
Medication effects on neuromuscular function

- Soooo----Medications can change the action of the neurotransmitters by either enhancing transmission, reducing transmission, or by directing reuptake back to the nerve cell.
- Neurotransmitters that increase neuronal activity – acetylcholine, dopamine, norepinephrine, glutamate.
- Neurotransmitters that inhibit or reduce transmission – GABA and glycine.

Neurotransmitters and neuromuscular function

- Medication can change the action of the neurotransmitters by changing their levels in the synapse of the nerves.
- This can result in enhancing transmission, reducing transmission.
- Reducing neurotransmitter levels results by its reuptake back into nerve or enzymatic breakdown of the neurotransmitter.
- An increase in therapeutic action of a medication is called agonism and a decreased action is called antagonism.

Acetylcholine and cognition

- Modulates neural activity through agonist effects on cholinergic receptors. These receptors play a role in cognitive function regulation of activities such as sustaining attention.
- Cholinergic neurons regulate sleep, arousal, motivation, reward, stimulus and cognitive processing and pain perception.
- Acetylcholine promotes REM sleep.
- Recently, it has been suggested that acetylcholine disruption may be a primary cause of depression.

Iversen, 2009 and Carl and Johnson 2006
One of the most vital roles of the cholinergic system is the effects on the hippocampus which is important for memory and learning. The loss of the basal forebrain cholinergic system is an important factor in the neurodegeneration in the brains of Alzheimer’s patients. There is typically extensive loss of the hippocampus, amygdala and neocortex function.

The cholinergic neurons in the Pons provide cholinergic intervention for the thalamus, midbrain and brainstem. The degeneration of cholinergic nerves is found in early Alzheimer’s and plays an important part in the loss of cognitive ability. Alzheimer’s disease is usually associated with neocortex and hippocampal cholinergic damage. Alzheimer’s medications usually focus on increasing the level of acetylcholine in the brain.

Serotonin can be found in regions such as the hippocampus and the amygdala, areas associated with anxiety and mood. Serotonin regulates sensory perception, motor activities, sleep, cognition, appetite, sexual behavior, hormone secretion, and temperature regulation. As a result, serotonin plays a critical role in age-related cognitive disorders and dementia such as Alzheimer’s.
Serotonin and cognition

- Serotonin has been linked to a wide variety of behaviors and drug actions.
- Involved in schizophrenia, phobic disorders, migraine disorders, sleep disorders, obsessive–compulsive behavior, affective disorders posttraumatic stress syndrome
- Medications that increase serotonin activity include many antidepressants, migraine meds.
- Serotonin also regulates smooth muscle activity such as gastrointestinal motility (Zofran)
- Serotonin syndrome – seizures, fever, hypertension, hallucinations due to excessive serotonin

Norepinephrine and cognition

- Norepinephrine is primarily found in the limbic system and hypothalamus though it is also found in all parts of the brain. It acts on the amygdala to stimulate attention and response.
- Norepinephrine is the neurotransmitter of sympathetic nerves in the peripheral nervous system.
- It is the “fight or flight” response of the body
- Meds that increase norepinephrine are used in attention deficit disorders (ADHD) – include Adderal, Ritalin, Strattera

Dopamine and cognition

- Dopamine is involved in motor control and memory control and reward systems
- Dopamine and acetylcholine (cholinergic) pathways are both responsible for providing motor control as well as cognitive and higher functions.
- For example, dopamine neurons in the medial temporal lobe are involved encoding and retrieval of sensory information.
- The presence of dopamine in the amygdala has been related to an increase in learning performance.
The prefrontal cortex is responsible for a number of behaviors including attention, monitoring the temporal sequence of stimuli, referencing stimuli to cues, devising abstract concepts and prioritizing the significance of stimuli. The dopamine projections to the prefrontal lobe are important in working memory.

Psychosis, delirium and schizophrenia behavior is associated with excessive central dopamine. Antipsychotic medications block dopamine activity and as a result decrease dopamine transmission.

A normal decrease in dopamine is found as people age. The decline can be accentuated with Parkinson’s disease. Decreased dopamine is the cause of extrapyramidal symptoms in Parkinson’s disease. It was noted that these patients had a profound depletion of central dopamine. Medications used to treat PD enhance the levels and effects of dopamine in the CNS.
Glutamate and cognition

- Glutamate is an excitatory amino acid neurotransmitter and is found in high levels in the brain.
- Abnormal activity of glutamate in the brain is associated with impaired cognition and Alzheimer’s disease.
- Namenda regulates glutamate activity in the brain and is used to treat Alzheimer’s disease.
- It is also known to assist in gastrointestinal function and GI wound healing

GABA and cognition

- An important inhibitory central neurotransmitter (gamma amino butyric acid) GABA reduces neurotransmission in the brain and promotes sedation and sleep.
- Medications that enhance GABA activity in the brain reduce excessive brain activity that is seen with anxiety disorders, insomnia and seizures

Medications affecting cognition
CNS depressants

- Central Nervous System depressants include anticonvulsants, sedatives, antipsychotics, antidepressants, and anti-anxiety medication.
- These agents change the action of neurotransmitters such as dopamine, GABA, histamine, acetylcholine, and serotonin in the central nervous system.
- CNS depressants can result in a reduced rate of neurotransmission and sedation and can slow down the cognitive process, cause sedation, and impair muscle coordination.

Anticholinergic Medications

- Anticholinergic medications block the effects of acetylcholine on central and peripheral cholinergic nerves.
- Anticholinergic medications are used to treat allergy (Benadyl), nausea (Phenergan), reduce drooling (Scopolamine), urinary incontinence (Detrol).
- Anticholinergic medications cause dry mouth, constipation, urinary retention, slowed gastrointestinal mobility, decreased gastric secretion.

Carl and Johnson, 2006
Dysphagia can result from anticholinergic-induced dry mouth (xerostomia) resulting in difficulty initiating a swallow, from abnormal peristalsis due to anticholinergic effects smooth visceral muscle or deglutitive inhibition due to anticholinergic effects on the esophageal striated or smooth muscle.

Anticholinergic medications can cause sedation, muscle incoordination and can result in cognitive impairment.

Elderly patients—especially vulnerable to these effects.

Anticholinergic medications reduce the effectiveness of medications used to treat dementia.

Cognitive impairment can affect rehabilitation success.

Histamines are used to contribute to a response of inflammation in the body. Antihistamines reduce inflammation with sinus problems and allergies.

Antihistamines also reduce acetylcholine effects on cholinergic receptors.

Can cause confusion and sedation and can cause xerostomia and impair GI motility.

OTC sleep aids: Tylenol PM, Sominex, and allergy meds: diphenhydramine (Benadryl) and chlorpheniramine (Clortab).

Magic mouthwash contains Benadryl can result in xerostomia, sedation and decreased GI motility if swallowed.
Chronic use of antihistamines, anticholinergic medications and many psychiatric drugs can result in memory loss.

Antihistamines function to block the neurotransmitter acetylcholine—important in functions of memory and cognition.

Anticholinergic medications can be cumulative in nature.

One study of heavy users of anticholinergic medications have increased death rates and morbidity.

Patients taking 3 or more anticholinergics over 90 days are over 3 times more likely to develop cognitive problems.

Patients taking stronger anticholinergic meds such as Benadryl, Elavil, Mellaril and Clozaril will develop a greater cognitive decline.

Many of the over-the-counter drugs such as Tylenol p.m. and allergy medications can also reduce cognitive functioning—atre on the Beer’s list (meds to avoid in the elderly).

Benzodiazepines
Benzodiazepines increase GABA effects in the CNS and include Ativan, Librium, Valium and Xanax, Restoril, Dalmane, Sonata. This class of medication has hypnotic, anticonvulsant, sedative, and muscle relaxant effects. Used judiciously benzodiazepines can be of assistance in enhancing physical and psychological well-being.

Benzodiazepines decrease anxiety. The decision of which benzodiazepine to be prescribed by the physician depends upon the onset rate, the elimination rate, drug interactions and potential side effects. Antianxiety medications can contribute to dysphagia by action of sedation, decreased concentration resulting in inattention to eating as well as ataxia and muscle discoordination.

Benzodiazepines also associated with gastrointestinal side effects that contribute to dysphagia and diarrhea, constipation, nausea, xerostomia as well as taste alterations can be side effects of medications such as Xanax. Chronic use of benzodiazepines can result in pharyngeal phase dysphagia, cricopharyngeal incoordination and aspiration. The pharyngeal dysphagia can be eliminated through cessation of the medication.

Carl and Johnson, 2006
Benzodiazepines can result in confusion, falls and sedation.
Benzodiazepines can result in anterograde amnesia (Ex: Versed)
Also shown to shortened sleep onset and suppress stage 4 and REM sleep (suppressing dreams).

Benzodiazepines that are long acting can result in profound confusion, cognitive impairment, forgetfulness, falls and morning hangover affect seen with longer acting meds like Valium
Xanax has a short half-life, with less of above problems, more potential for dependence and withdrawal side effects.
Versed is very short acting- used in procedures

Drug interactions with medications such as COPD medications, antacids, antidepressants, and many anti-infective medications result in decreased benzodiazepine clearance and increased sedation that affects cognition.
For example, Xanax mixed with Tagamet will increase sedation due to decreased benzodiazepine clearance
Benzodiazepine/side effects

- Side effects include sedation, dizziness, weakness, drowsiness, amnesia, memory impairment, fatigue, ataxia, and slurred speech.
- Chronic use of benzodiazepines increase risk of dementia by up to 50%.
- Taste loss is noted with Xanax - unpleasant taste is noted with Ambien’s use

Antidepressants

- Depression is an illness that reduces the ability to concentrate and experience pleasure and impairs cognition.
- Other symptoms are social withdrawal, guilt, apathy, changes in appetite and sleep disturbances.
- Antidepressant medications increase levels of norepinephrine and serotonin and can improve cognitive impairment and other symptoms seen with depression
- 50% of patients started on an antidepressant will stop taking it within the first month
Sedation is a common side effect of some antidepressants. Sedation side effects include decreased attention while eating and decreased appetite. Sedation is particularly noticeable in the first one or 2 weeks of the initiation of an antidepressant. Sedation can impair cognition initially, but will improve cognition after 6 weeks as depression improves. Suicide risk is increased with the use of antidepressants in children and young adults.

Tricyclic antidepressants such as Elavil result in high levels sedation. SSRIs such as Paxil, Zoloft, and Prozac have low levels of sedation. Atypical antidepressants Effexor or Wellbutrin have low risk of sedation whereas Remeron as high risk of sedation.

In addition to sedation antidepressants can also result in central nervous system effects such as confusion and agitation. These effects can affect communication and dysphagia assessment as well as treatment. Drug interactions combined with antianxiety results in a mixed picture depending upon the antidepressant. Combining Prozac and Xanax can increase sedation. Interactions between BuSpar and Prozac however decrease Prozac’s effect.
Antidepressants

- Many of the antidepressants change taste affecting appetite and PO intake.
- Several of the tricyclic antidepressants such as amitriptyline (Elavil) have high anticholinergic effects result in dry mouth remove taste completely.
- In most instances unpleasant taste is the norm – Prozac, Zoloft, Paxil, Effexor

Antidepressants

- Choice of antidepressant should consider individual effects on cognition, sedation, agitation, motor discoordination, dysphagia, effect upon communication, falls.
- For example, tricyclics such as Elavil have anticholinergic effects that can result in sedation, increased risk for orthostasis and falls, impaired cognition.
- SSRIs such as Zoloft increase serotonin so cause GI side effects but do not affect acetylcholine and have less problems with cognition, sedation, agitation.

Antipsychotic Agents
Definitions
- Psychosis is a psychiatric disease
  - disturbance of thinking and personality
  - altered dopamine—affects sensitivity to stimuli with distorted perceptions
- Psychotic symptoms seen with
  - Bipolar disorder
  - Depression
  - cognitive disorders
  - Alzheimer’s
  - Autism
  - oppositional defiant disorder
  - conduct disorder

Schizophrenia
- Schizo (split) and phrene (mind)
- Fragmented thoughts (not split personality)
- Schizophrenia—most common form
  - Affects 1% of the population
  - strong genetic component triggered by environmental stressor
  - 1st degree relative, 10% risk, both parents, 40% risk
  - Typical onset between late teens and mid thirties
  - Major cause of disability, limiting ability to establish and maintain employment equivalent to quadriplegia

Prevalence and Impact of Schizophrenia
- 20% of hospital bed days, 50% of psychiatric bed days
- Annual US Costs to treat Schizophrenia—$66.7 Billion dollars
- Substance abuse is common
- 20% reduction in life expectancy
  - increased coronary heart disease
  - Cigarette smoking
  - Obesity leading to dyslipidemia
  - Insulin resistance and diabetes
  - Hypertension
  - Suicide (7–10 times higher)
  - 25–50% attempt Suicide, 5–10% succeed
Diagnostic criteria:
- One month of the following symptoms:
  - **Positive Symptoms (extra symptoms):**
    - Delusions (fixed false beliefs)
    - Hallucinations (perceptual disturbances)
  - **Negative symptoms (lacking symptoms):**
    - Catatonia
    - Language or cognitive impairment
- Persistent disturbances in social, occupational and self-care functioning for at least 6 months

**Definitions:**
- **Catatonia:**
  - motor immobility, catalepsy (muscle rigidity) or stupor
  - excessive motor activity (purposeless, not influenced by external stimuli)
  - extreme negativism (motiveless resistance to all instructions or maintenance of a rigid posture against attempts to be moved)
  - mutism
  - Posturing

**Classification of Symptoms**
- **Positive**—*extra* symptoms—excess dopamine
  - disorganized speech or behavior
  - Delusions
  - hallucinations
  - “flooding of sensations”
- **Negative**—*lacking symptoms*—reduced dopamine
  - affective flattening
  - alogia
  - Anhedonia
  - Avolition
- **Mood symptoms:** anxiety, hostility, depression, excitement—may lead to suicidal behavior
Cognitive and Language Impairment

- Cognitive impairment:
  - short term memory loss, impaired attention, executive function, working memory, semantic memory
- Language Impairment:
  - deficiencies in comprehension, complex sentence generation, verbal fluency
  - alogia, perseveration, bizarre content with neologisms
  - dysprosody, echolalia, concreteness, derailment, blocking, clang associations
  - unintelligible speech, inappropriate nonverbal communication, mutism

Antipsychotics/sedation

- 1st and 2nd generation agents—both effective, side effect profiles differ
- 2nd generation agents better at treating negative symptoms
- Sedation associated with antipsychotic meds can impair mental or physical abilities, decreased appetite and attention to eating (especially seen after starting or immediately after a dosage change) drowsiness may occur for 1st and 2nd week.
- Sedation that remains after this time is an indication to lower the dose or look for a drug interaction

Antipsychotic agents

- Older (1st generation) antipsychotics such as Stelazine, Thorazine, and Haldol are used for the treatment of hallucinations and delusions.
- Side effects include sedation, parkinsonism, tardive dyskinesia and delusions and vary depending upon the agent utilized.
- Thorazine use has a high risk of sedation and a low to moderate probability of extrapyramidal symptoms, whereas Haldol has a low risk of sedation but a high risk of EPS

Carl, Gallo, Johnson 2014
Extrapyramidal (EPS)

- High incidence of extrapyramidal symptoms including tardive dyskinesia.
- EPS symptoms can include muscle rigidity, resting and intentional tremor, pill rolling, cogwheel rigidity, masked facies.
- Extrapyramidal symptoms can contribute to dysphagia in patients receiving antipsychotic meds

Carl and Johnson, 2006

Antipsychotic/neuroleptic associated choking

- Choking associated with psychotropic drug use especially with multiple antipsychotics or when combined with anticholinergic medications such as Benadryl, Cogentin or Artane.
- Risk in psychiatric hospitals of asphyxiation is 100 times that of the normal population
- Choking precautions are needed
- Higher risk in older (1st generation) antipsychotics

Antipsychotics

- Newer 2nd generation (atypical) antipsychotics results in a mixed picture of sedation risk.
  - Clozaril, Zyprexa, and Seroquel= high probability of sedation
  - Geodon= moderate probability
  - Abilify= low probability.
- Combining with anticholinergic meds can result in a decreased antipsychotic effects and reduced EPS effects
- Combining with Valium increases risk of sedation, ataxia, respiratory depression

Carl, Gallo, Johnson, 2014
Patient Case– P.J.

- P.J. is a 35 year old male with a 15 year history of psychosis precipitated by substance abuse.
- His psychosis is characterized by repeated acts of aggression, agitation, hallucinations, and delusions of being the reincarnate of Bruce Lee.
- He perceives all of his movements to be so fast that they are not visible to the human eye and believes he has a unique understanding of the laws of the universe.
- What risk factors for schizophrenia does P.J. have?
- What symptoms of schizophrenia does P.J. exhibit?
- What positive symptoms does P.J. exhibit?

Patient Case– P.J.

A Code Blue is called in the dining hall of P.J.’s long term care facility, and staff members find P.J. choking on a piece of meat. He exhibits significant dystonia of his face, neck and extremities.
- An emergent injection of Benadryl is administered, which relieves the symptoms, and his oral pharyngeal passage is cleared of any food.
- P.J. has been receiving the following medications:
  - Oral Geodon plus Prolixin depot injection once a month.
  - Haloperidol IM was added in the past week to control his delusions and reduce aggressive attacks.
  - Claritin D as needed for nasal congestion
  - Dilantin for a seizure disorder
  - Restoril as needed for sleep.

P.J.’s choking is most likely due to what type of effects:
- a) Extrapyramidal side effects
- b) Anticholinergic side effects
- c) Sedative side effects

What Medications were involved in the drug interaction precipitated his choking?
- a) Geodon
- b) Prolixin
- c) Haloperidol
- d) Dilantin
- e) Restoril
Medications that effectively treat depression, anxiety, ADHD and psychosis can improve cognition dysfunction associated with these disease states.

Acetylcholine—facilitates memory.

Acetylcholinesterase Inhibitors improve cognitive function in dementia.
  - Prevent the enzymatic breakdown of acetylcholine, increasing availability in the brain.
  - Enhance motor and cognitive function in patients with dementia

Soooonnnnnnnnnnnn

These medications inhibit the loss of acetylcholine. These inhibitors result in a modest increase in cognition lasting 6 months in one third to ½ of patients with Alzheimer's.

They increase ADL functioning (eating, grooming, and walking).

They have been shown to improve anxiety and apathy.

These inhibitors appear to work best started early—once diagnosis is made.
These inhibitors has been shown to work with Lewy bodies syndrome, Alzheimer’s, vascular dementia, and Parkinson’s disease with dementia.

As acetylcholine esterase inhibitors work best at higher dosages of medicine they should be titrated up to the higher doses. The titration should occur slowly to avoid G.I. difficulties.

Start low/go slow

Medications thought to improve cognition

Aricept– (generic donepezil)
Thought to be effective in 40% of patients with mild to severe Alzheimer’s.
Patient dropout rates ranges from 7 to 32%.
Adverse effects are mild and range from diarrhea, fatigue, and vomiting.
Aricept received positive efficacy per patient report with mild to moderate dementia.

Aricept has long half-life of 70 to 80 hours permitting daily dosing
Patient report improvements in cognitive functioning that have been maintained for years.
A small percentage of patients report negative emotional effects (5%)—discontinuation of Aricept corrects the problem.
Medications thought to enhance cognition
- Dose varies with stage of dementia.
- Aricept is dosed at 5 to 15 mg for mild to moderate dementia and 15 to 23 mg for moderate to severe dementia.
- Manufacturer states that while the medication can be used solo it does best when used in combination.
- Prescriber should start low go slow.
- Some patients in clinical trials have demonstrated cognitive improvement for years

Medications thought to increase cognition
- Exelon (rivastigmine)
- Acetylcholine esterase inhibitor
- Available in patch form
- Should be initiated in a 4.5 mg dose applied once a day for the initial 4 weeks and then increased to 9.5 mg daily
- Has a prolonged duration of action and should be given with food

Medications thought to improve cognition
- The Exelon patch was initially developed for patients with Parkinson’s disease
- It has been utilized in combination with Aricept for some patients to improve memory.
- Significant improvements are noted in ADLs and cognition in mild to moderate Alzheimer’s with 12 mg per day dose
Medications thought to improve cognition

- **Razadyne (Galantamine)**
  - Another acetylcholine esterase inhibitor
  - Drug not used as frequently as Exelon and Aricept.
  - Has a half-life of 57 hours and must be given with food
  - Results in improvement for about 9 months longer than other agents

- **Namenda (generic memantine) – cognitive enhancer**
  - Modulates the activity of glutamates action on the NMDA receptors in the brain and is also used in treatment of dementia
  - Comes in 5, 10, 15, and 20 mg.
  - Used a single agent or in combination with Exelon, Razadyne, or Aricept (enhance acetylcholine effects)
  - Peak blood levels are seen within 3 to 7 hours with therapeutic results within 2 weeks
  - Titration can occur every week (7 days) until a daily dose of 20 mg is obtained

- **Medications thought to improve cognitive function**
  - Patients with kidney disease should receive lower doses
  - Side effects include drowsiness, agitation, confusion, constipation, fatigue, and urinary incontinence.
  - Most studies have pointed to an overall improvement of approximately 15% in cognitive function

- **Johnson 2013**
- **Iversen 2009, Johnson 2000**
Patient Case: Alzheimer’s Disease

- B.W. is an 82 year old female with Alzheimer’s disease. She is receiving rehabilitation to maintain her cognitive level and QOL.
- Concurrent medical conditions include diabetes, depression, hyperlipidemia, and mild renal insufficiency.
- Current Medication List:
  - Amaryl 4mg daily for diabetes
  - Effexor XR 150mg daily for depression
  - Atorvastatin 20mg daily for hyperlipidemia
  - Galantamine (Razadyne) 20 mg daily was recently initiated for her Alzheimer’s.

Her daughter who is B.W.’s caregiver calls to cancel her therapy and reports that recently her mom has been complaining of muscle pain, muscle weakness and fatigue.
- She has been giving her Motrin IB over the counter to relieve the symptoms, without relief.
- In addition, her mom seems more confused than ever, with more difficulty sleeping at night, and nausea that has resulted in a decline in oral intake.

- What is the reason for B.W.’s symptoms?
- How should B.W.’s regimen be adjusted?
- What therapeutic concepts does this case illustrate?

The SLP needs to become familiar with the medications their patient is taking. The SLP is not the prescriber of medicine. The SLP however is in a good position to note changes in behavior based on medicine changes.

These changes in behavior should be reported to the prescribing physician and pharmacist. It is in the SLPs best interest to develop a working relationship with the pharmacist.

The pharmacist is always looking for the effects of medications on patient behavior.
summary

- The SLP needs to be able to discern changes in behavior, motor movement, communication, and dysphagia.
- These changes need to be discussed with the pharmacist so that he/she understands the concern of the SLP and can communicate that concern to the physician.
- THANK YOU!