
EARTHY OVERTONES, NOTES OF SWEETNESS, BUTTERY SMOOTH...
60-YEAR OLD DIABETIC, HIGH CHOLESTEROL.
STETHOJOKE™ '22

Apollo Neuro Wearable Therapeutic Device for Wellbeing: Volunteer for Research Study

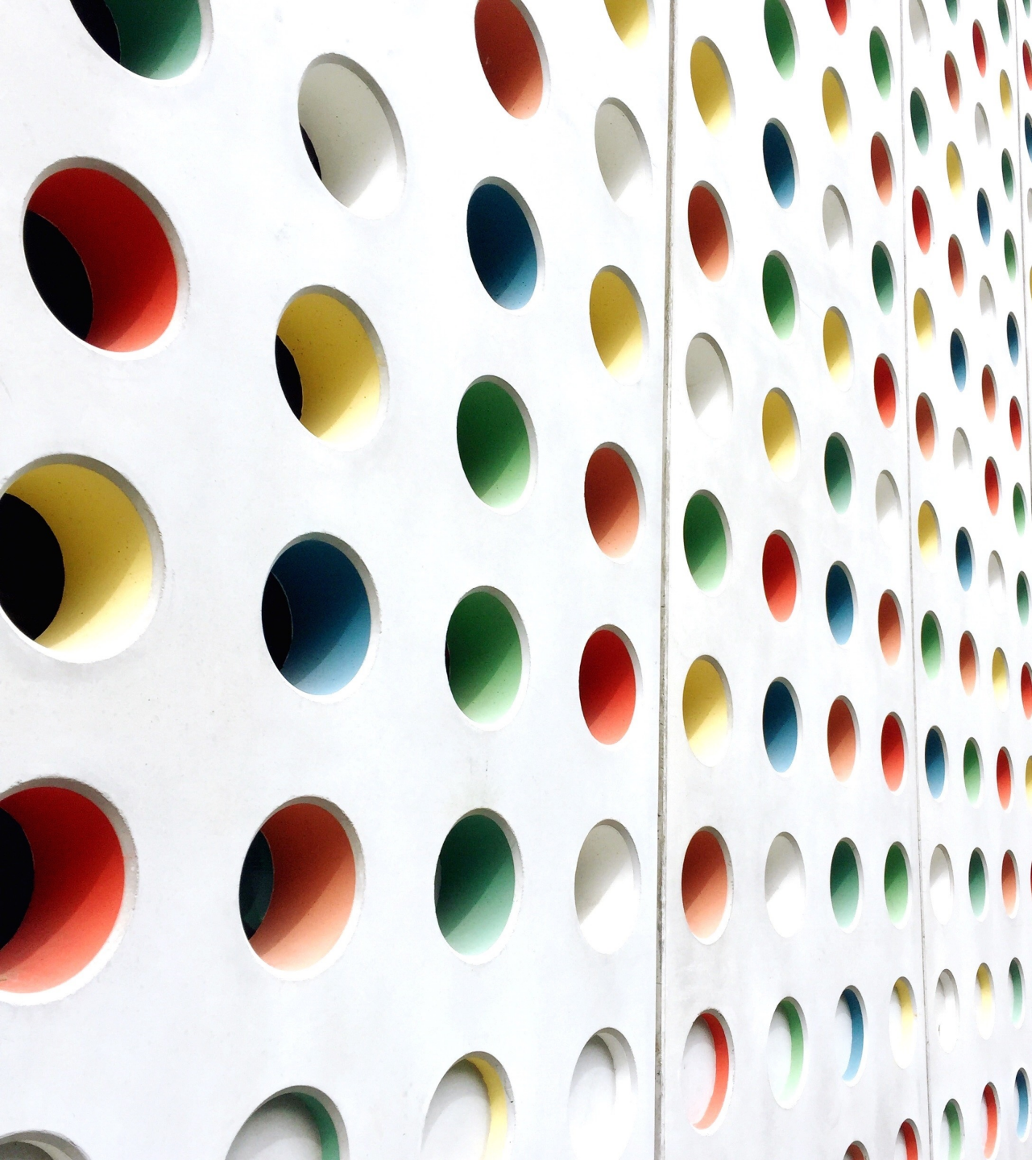
Researchers at Washington State University Spokane are looking for medical and pharmacy students to use a commercially available wearable therapeutic device to study stress and wellbeing.

Those eligible to participate will be:

- Adults 18 years of age or older
- Medical or pharmacy degree candidates at Washington State University Health Sciences
- Able speak and read English and complete a one-time web-based class
- Able to complete ~15 minutes of online questionnaires before, during, and after the study
- Owners of a functional Android or Apple smartphone.

For additional information, use the QR code or contact the research team at skye_mckennon@wsu.edu.

This study has been reviewed and approved by WSU Institutional Review Board (irb@wsu.edu), IRB # 20178. Principal Investigator: Skye McKennon WSU College of Medicine; 509-358-7944; skye_mckennon@wsu.edu.



Geriatric Pharmacology Cases

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Objectives

Describe the pharmacokinetic and pharmacodynamic changes that may occur in older adults

Select a medication that would reduce the likelihood of anti-cholinergic effects for an older adult

State principles of medication dose selection for older adults

A Thought Question

- During a well-deserved study break, you are able to get some refreshing exercise.
- What would you like each of the key organs listed on the table to be doing while you exercise?

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	
Lung	
Bowels	
Bladder	
Mouth	

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	Increased rate and contractility
Lung	
Bowels	
Bladder	
Mouth	

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	Increased rate and contractility
Lung	bronchodilation
Bowels	
Bladder	
Mouth	

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	Increased rate and contractility
Lung	bronchodilation
Bowels	Reduced function/slowing
Bladder	
Mouth	

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	Increased rate and contractility
Lung	bronchodilation
Bowels	Reduced function/slowing
Bladder	Urinary retention
Mouth	

Exercise and Organ Function

Organ	Desired Effect for Exercise
Heart	Increased rate and contractility
Lung	bronchodilation
Bowels	Reduced function/slowing
Bladder	Urinary retention
Mouth	Decreased secretions

Short Discussion

An important part of pharmacology in geriatrics is the effect of anti-muscarinic (anti-cholinergic agents)

Please try to fill out the table on the following slide, and we'll then fill this out together

Hint: the previous slides may help you to consider this

Organ	Key Anti-Cholinergic Medication Effect
Brain	
Bowels	
Bladder	
Lungs	
Heart	
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	
Bladder	
Lungs	
Heart	
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	
Lungs	
Heart	
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	*Urinary Retention*
Lungs	
Heart	
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	*Urinary Retention*
Lungs	*Bronchodilation*
Heart	
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	*Urinary Retention*
Lungs	*Bronchodilation*
Heart	*Tachycardia*
Mouth	
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	*Urinary Retention*
Lungs	*Bronchodilation*
Heart	*Tachycardia*
Mouth	*Xerostomia*
Eyes	

Organ	Key Anti-Cholinergic Effect
Brain	*Confusion*
Bowels	*Constipation*
Bladder	*Urinary Retention*
Lungs	*Bronchodilation*
Heart	*Tachycardia*
Mouth	*Xerostomia*
Eyes	*Xerophthalmia / Mydriasis*

An actual case

You are seeing a 71 year old male patient who is complaining of neuropathic pain and has lower extremity edema. You see the patient is taking pregabalin (Lyrica) for the nerve pain. You know that pregabalin can cause edema.

You find out that the patient had gabapentin in the past at a dose of 300 mg TID. He reports that he thought it worked well but that his neighbor, who is a nurse, told him this was too low of a dose to be helpful. His prescriber at the time also told him he was too old to take this and switched him to pregabalin.

You can look up gabapentin and pregabalin and then we will vote on a decision.

What would you do?

Stop the pregabalin

Change the pregabalin to gabapentin

Keep everything the same

Increase the dose of the pregabalin

Takeaways from this case

What takeaways do you have from this case that would relate to the principles in the pre-class material?

Or . . . do you think this case is the opposite of the pre-class material?

Takeaways from the case

Though gabapentin can cause CNS depressant effects, there is not a reason to keep him from using this just because he is an older adult. He could be started on it with a low dose (start low, go slow), which he was.

Note that per patient report he was not getting any side effects from the gabapentin

Though the dose is relatively low, we wouldn't want to stop it just because it is low. Remember that older patients may be more sensitive to medication effects. This is important for side effects, but it also means that doses may not need to be as high to be efficacious (so we had already gotten somewhere)

Therefore, an important takeaway is to use the principles but still evaluate the patient

A Thought Question

A 75 year old patient has been taking gabapentin for neuropathic pain for several years at a dose of 600 mg TID. You note that recently the patient has had creatinine clearances (CrCl) that have ranged between 55 mL/min and 64 mL/min.

You note that gabapentin's dosing information indicates that for a CrCl of $\geq$ 60 mL/min no dose adjustment is needed (and geriatric dosing can go up to 3600 mg/day). However, for a creatinine clearance between 30 and 59 mL/min, the dose should be between 400 and 1400 mg daily.

How would you approach this?

Case Takeaways

Note that reductions in dose related to renal function are there because the patient can essentially receive a higher dose of the medication when there is reduced renal function

The blood level for medication will therefore be on a spectrum, not in "jumps" like we would see with the creatinine clearance cutoffs

Note that patient sensitivity and other medications (such as other CNS depressants) may affect how a medication is tolerated, so renal doses are only part of the effect

Though some patients may tolerate doses that are higher than recommended, other patients may need lower than expected doses, especially with age

Finally, the potential severity of effects and ability to monitor are important

Another actual case

An 82 year old female patient has been taking the long-acting benzodiazepine flurazepam for about 5 years. She takes it at bedtime and reports she was started on it to help her sleep when her husband died. She reports it does not cause any side effects for her, but she also doesn't think she needs it any longer.

What considerations do you have for this case?

Let's make a decision!

What to Do?

What do think would be the best thing to do?

Stop the flurazepam now

Keep the flurazepam

Gradually decrease then stop the flurazepam

Switch to a different benzodiazepine

A Thought Question

A new medication is known to have strong, non-selective anti-cholinergic effects but is a quaternary amine so it does not cross the blood-brain barrier easily

What side effects would you expect from this medication?

Since this is non-selective it will cause many of the systemic anti-cholinergic effects but will be less likely to cause confusion since it will not cross the blood-brain barrier as easily

Questions?

Thank you!

You can reach me at brian.gates@wsu.edu

Stop the pregabalin

When you follow-up with the patient, he states that his edema has gotten better, but that his pain seems to be getting worse

Back to the question

Change the pregabalin to gabapentin

When you follow-up with the patient, he reports that his edema has improved and his pain is actually getting better. He thanks you for making the change.

Back to the case

Keep everything the same

When you follow-up, the patient states his pain is still an issue and his edema is still bothering him

Back to the case

Increase the dose of pregabalin

Upon follow-up, he reports that his pain may be slightly better but is still not good. He also states that his edema seems even worse.

Back to the case

Stop the flurazepam now

On follow-up, the patient reports she has had a few problems with sleeping. As you interview her, it seems she may have had some withdrawal symptoms, though overall they are mild.

Back to the case

Keep the flurazepam

She does OK for a while, but a little over a year later, she begins to complain of excessive drowsiness.

Why do you think this happened?

Back to the case

Gradually decrease then stop the flurazepam

As the medication is tapered down, she reports that she does not have trouble sleeping. She reports she does seem to have more energy and is glad she stopped this.

Back to the case

Switch to a different benzodiazepine

Which one would you switch her to?

She ends up feeling that she does not need it and ends up discontinuing it.

Back to the case