

**What you need in the writing assignment:**

1. Your name, date, and title of the paper.
2. Introduce the name of the pharmaceutical drug and what it is prescribed to treat.
3. Explain the normal physiology involved in the body function, and what is happening during abnormal function of that system.
4. Explain the physiology of HOW that drug treats the problem, trying to bring into the assignment as much material that you've learned in lecture as possible.
5. Make sure and cite your sources within the body of the writing assignment as numerical superscripts (see example assignment). A numerical superscript looks like this<sup>1</sup>.
6. End with a Literature Cited section. You must cite from the Wikibooks course textbook as a bare minimum, but you can find and use other reputable sources. If sources are online, give full https link.

I don't care if you use single or double space. Keep to regular fonts types between 11 – 12pt in size. Spelling and grammar will count! I have not set a specific page count for this writing assignment. Use what seems appropriate to get the information across to me. If you use acronyms, please explain what they stand for. (For example ACh stands for acetylcholine.)

**Example Lecture Writing Assignment Below:**

*(This means writing about Viagra, Levitra, Cialis or other ED drug treatments that work as phosphodiesterase inhibitors is off limits).*

**Human Physiology (Biol 236) Lecture Writing Assignment****Fall 2020****Tamatha Barbeau****Viagra: The Little Blue Pill**

Sildenafil (or Viagra) is a pharmaceutical drug advertised on television to treat erectile dysfunction (ED)<sup>1</sup>. In order to understand how Viagra treats ED one must first understand the normal physiological process involved in an erection.

A normal erection occurs when sensory stimuli (caused by sexual arousal) cause nitric oxide (NO), a gaseous neurotransmitter, to be released from motor nerves into the synapses with arteriole smooth muscle cells located within the corpus cavernosa (erectile tissue) of the penis. The NO binds to muscarinic acetylcholine (ACh) receptors on the membrane of arteriole smooth muscle cells\*. Receptor binding with NO activates an enzyme (guanylate cyclase), and then activates the second messenger called cyclic guanosine monophosphate (cGMP). The cGMP then causes phosphorylation of protein kinases that function to open calcium channels on arteriole smooth muscle cells causing muscle relaxation and arteriole vasodilation. Arteriole vasodilation within the corpus cavernosum results in the increased blood flow necessary for an erection to occur<sup>2</sup>. When sexual arousal wanes the production of NO decreases and the

cGMP second messenger is broken down by an enzyme called phosphodiesterase. Without cGMP protein kinase phosphorylation decreases and ultimately vasodilation of penile arterioles decreases resulting in penile relaxation or detumescence.

ED typically involves decreased arteriole blood flow to the corpus cavernosum of the penis resulting in decreased penile tumescence. Most pharmacological treatments of ED involve increasing blood flow to the penis, and this is exactly what Viagra does. Viagra increases penile arteriole vasodilation by inhibiting phosphodiesterase – the enzyme that breaks down cGMP. The inhibition of phosphodiesterase results in increased cGMP levels, which promotes continued arteriole vasodilation within the penis and facilitates and maintains an erection. Therefore, Viagra is a cGMP agonist because it increases the activity of cGMP on arteriole vasodilation<sup>3,4</sup>. Some side effects of taking Viagra include priapism (an erection lasting longer than three hours), blurred vision, dizziness, or faintness. These side effects are produced by the systemic wide vasodilation that occurs in arteries throughout the body – not just the penile arterioles. Patients taking nitrate-based vasodilators for cardiovascular disease should consult with their doctor before taking Viagra as this ED drug can cause an unsafe drop in blood pressure when taken in conjunction with these other drugs.

*\*Some research also indicates that NO might act through acetylcholine- and epinephrine-independent receptors as well.*

#### **Literature Cited:**

1. Viagra commercial video: [http://www.youtube.com/watch?v=L7ojmDp\\_b5U&feature=player\\_embedded](http://www.youtube.com/watch?v=L7ojmDp_b5U&feature=player_embedded)
2. Physiology of an erection: [http://en.wikipedia.org/wiki/Biological\\_functions\\_of\\_nitric\\_oxide](http://en.wikipedia.org/wiki/Biological_functions_of_nitric_oxide)
3. Wikibooks Contributors, Human Physiology. 2017. (Pgs 287-288)
4. Viagra functions: [http://www.arn.org/docs/glicksman/eyw\\_051201.htm](http://www.arn.org/docs/glicksman/eyw_051201.htm)