

# Neurotransmitters and neuropharmacology



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## The Chemistry of Behavior: Neurotransmitters and Neuropharmacology

1. Club drugs is a word that means psychoactive substances that are linked to nightclubs, parties, raves, or concerts. Some of the club drugs are MDMA, ketamine, gamma-Butyrolactone, gamma hydroxybutyrate, Rohypnol, and methamphetamine. There is a trend of taking club drugs because they are cheap and people believe that club drugs can help increase social interaction. Looking at the trends in prevalence of the club drugs in eighth, tenth, and twelfth graders during, I came up with the conclusion that the tenth and twelfth graders have the highest prevalence percentage compared to the eighth graders. In two thousand and thirteen, MDMA had a lifetime prevalence percentage of 1. 80% in eighth grade, 5. 70% in tenth grade, and 7. 10% in twelfth grade. In two thousand and twelve, ketamine had a prevalence percentage of 1. 40% in twelfth grade. In the eighth and tenth grader there was no statistics. I could not find the statistics prevalence of the club drug gamma-Butyrolactone. In a website, it said that it might be high. It might be high because it has a lot of commercial uses and industrial uses. In two thousand and twelve, gamma hydroxybutyrate had a prevalence percentage of 1. 00% in twelfth grade. There were no statistics in eighth and tenth graders. In two thousand and thirteen, rohypnol had a lifetime prevalence percentage of 0. 70% in eighth grade and 1. 10% in tenth grade. There was no statistic in the twelfth grade. In two thousand and thirteen, methamphetamine had a lifetime prevalence percentage of 1. 40% in eighth grade, 1. 60% in tenth grade, and 1. 50% in twelve grade.

Reading about the drug policy made me think more about it. I believe that there is something missing that it is not working completely. Maybe there

should be more education about drugs starting when a kid is in the elementary school. It should continue throughout their entire school lives. It should not be for a few weeks only. Maybe if a child learns about the danger of taking drugs since they were little and continues to know more about it throughout his/her life, it could help to reinforce the belief that drugs are dangerous. I believe that there should be a drug policy that can help before a person decides on trying out drugs and after a person takes drugs. The people who make drug policy should find out what is leading people to take drugs. Finding out about this could maybe help out in solving it, so people will not take drugs. For example, the drug policy in Mexico is to capture the drug dealers. I agree that the drug dealers should be capture, but there should be some other factors that will prevent people to joining in the drug dealing. I believe that not being able to continue to go to school because he/she has to work to help maintain the family is one of the factors that are leading people to be in the drug dealing. Since they do not have education and there is not that many job opportunities, it is what making some people join the drug dealing. There might be other factors that one has not thought about that could lead to a better drug policy.

2. Before reading the websites and articles that was provided, I already knew that drinking alcohol while pregnant is harmful for the baby. I just did not know the exact amount of alcohol that is needed for it to be consider harmful for the baby. Based on what I read about drinking alcohol while pregnant, drinking too much alcohol and drinking every day is for sure harmful for the baby. It is harmful because the baby is developing inside the mother's stomach. It is important for the baby's development to be as healthy as

possible, so the baby can be born healthy. Too much drinking alcohol while pregnant can cause miscarriage and stillbirth. It could also risk the baby of having a low birth weight, hyperactivity, problems with learning, problems with speech, problems with attention span, and problems with language. The baby can be born with fetal alcohol syndrome. Some of the articles that I have read said that drinking alcohol in moderation while pregnant is not harmful for the baby. In other articles, it said that whatever amount of alcohol is still consider harmful for the baby. I even have read somewhere before that there is not enough studies done to demonstrate that drinking alcohol in moderation while pregnant is harmful for the baby. I believe the studies that have been supposedly done to demonstrate that drinking alcohol in moderation is not harmful for the baby could have been the results from other factors. I believe that there has to be a lot of studies done to demonstrate that drinking alcohol in moderation is safe while pregnant. It has to also consider other factors that could have lead for the baby to be born healthy, even though his/her mother drank alcohol in moderation while pregnant. I believe that to just to be safe, it is better for a female that is pregnant to not drink alcohol at all. I would not like to risk my baby's health because I was not willing to stop drinking alcohol while I was pregnant.

3. An article name “ Caffeine overdose killed high school senior, coroner finds,” from CBC news is exactly what the name of the article is about. An eighteen year old guy name Logan Stiner died. He was a healthy good student. His blood result demonstrated that he had a very high level of caffeine in his body. Consuming caffeine is not harmful when it is from coffee or other beverages. It is consider harmful when it is consume in an overdose

amount. In the internet anyone can buy powdered caffeine. Powdered caffeine is harmful because thirty cups of coffee is the same as a teaspoon of the caffeine powder. Two cups of coffee is about the same as one-sixteenth of a teaspoon of the caffeine powder. In the United States, it has been found that there were eighteen other death cases from caffeine overdose. The deaths were accidental or suicides. Dr. Stephen Evans thinks that in some deaths it has not been reported that it is due to an overdose of caffeine. It is because a small number of pathologists checks for caffeine levels in deaths that appears to be from cardiac arrhythmia and seizure. A special kind of test is required to check for caffeine levels. Someone who is experiencing a heartbeat of one hundred and fifty beats per minute, visual disturbance, unusual tremors or sweating is probably experiencing a caffeine overdose.

An article name “Cocoa ‘might prevent memory decline’,” from the BBC News Health website is exactly what the name of the article is about. There was a study that was done with sixty older people who did not have dementia. The study found that the participants who drank two cups of cocoa each day had an improvement in their blood flow to the brain. These people had problems in their blood flow to the brain. When the study was finished, researchers also found out that they did well on memory tests. A new study was done on sixty people. These people had an average age of seventy-three. They were asked to drink each day two cups of cocoa and not to drink or eat any other chocolate. One of the groups had high flavanol cocoa. The other group had a low flavanol cocoa. At the beginning of the study, ultrasound tests demonstrated that seventeen of the participants had decreased blood flow to the brain. No differences were found between the

two groups. An eighty-eight percent of the participants had improvements in blood flow to the brain and improvements in cognitive tests compare to the thirty-seven percent of the participants who did not had impaired blood flow. In twenty-four participants, the MRI scans demonstrated that there was brain damage in small areas in the participants who have impaired blood flow. The no differences found between the two types of cocoa given could have been because of an ingredient that was in both of them that had an effect. This study could have probably been better if there was a control group like participants who did not consume cocoa. Poor vascular health is one of the factors that could make people be in risk for dementia. There could be new treatments and preventions if researchers can find the relationship between poor vascular health and declining brain health.

## 5. Hormones and the Brain

1. Peptide hormones could be transported in the bloodstream freely and then diffuse to a cell when it could interact with the cell's appropriate receptor.

The steroid hormones are non-polar and the peptide hormones are polar.

The hormones steroids are cholesterol molecules that have been modify.

The testosterone and estradiol have the same cholesterol backbone, but their functional groups are different.

The steroid hormones have a longer half-life and peptide hormones have a shorter half-life.

2. The study conducted by Zak was about distrust and testosterone. In men, their level of DHT increased a lot. In women, their level of DHT did not increase. The distrust meant that a stranger has not sent money or has sent less money. A person can triple in value if he/she would have sent money to another person. Having an increased DHT was thought that if a person was distrusted he/she given the chance to share money will not send the money. Not having an increased in DHT was thought that they will send money to a stranger, even though he/she was distrusted because the money that was sent was less. This experiment resulted in that women are way nicer than men because of the testosterone. Years later they wanted to do more in this experiment. In each of the male participants, they drew four tubes of blood. They rubbed to some of the male participant's shoulder a prescription gel called Androgel. Androgel is a testosterone replacement gel. Some of the other male participants were rubbed with a gel that was a placebo. The male participants had to come back in the next morning, so they can draw four tubes of blood. After the Androgel was rubbed in some of the participant's shoulder, the level of testosterone will be in their highest in sixteen hours. Each of the male participants had to decide if they wanted to share their money. Whether they wanted or not, will count as being nice or mean towards the other male participants. The male participants that had a mean offer might be rejected by the other male participants. This kind of offer will make both of the male participants to lose all the money that they had. This experiment was done again four weeks later. Now what they did was to rub in their shoulder's the other kind of gel, so they can compare the behaviors when the male participants had the prescription gel and when they had the placebo gel. When the male participants received the

prescription gel, they were twenty-seven percent meaner because they did not want to share the money with the other male participants. People with aggression turn into sports to help them out.

I believe that it is wrong to say that testosterone is the main cause of aggression. Just because testosterone has been linked to aggression, it does not mean that it was the only factor that caused aggression. I think people believe in this because they hear about this all the time. Since it has been found that testosterone has been linked to aggression, people do not stop and think about it carefully. It is just too easy to believe that testosterone is the main cause of aggression. It might have more than one factor that together with the testosterone it will cause aggression. Some of the factors that I believe that together with the testosterone will cause aggression are life experiences, health problems, mental health problems, and genetics. All of these factors should be considered in experiments. I have known a person that was violent because of the life experiences that he went through while growing up. As a teenager, this person was not violent at all. Once he got professional help, he was not violent anymore. There were techniques that he had to do every day to help him not be violent anymore. It was not easy at first, but he made it. I have heard of health problems and mental health problems that were causing the aggression. Receiving professional help made them be less aggressive each day. What if a drink or food was causing the aggression? I believe that one has to be more open minded to think beyond what one hears or sees. More studies should be done.

3. Hormone replacement therapy is a treatment that someone can get to receive the hormones that are low or lack of. There are risks and possible

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benefits of receiving hormone replacement therapy. The research that I have done says that the risks or benefits of hormone replacement therapy depends on the person's medical history, family medical history, age, type of menopause, and even lifestyle. The risks are venous thromboembolism, breast cancer, stroke, ovarian cancer, colorectal cancer, heart disease, and endometrial cancer. The benefits of receiving hormone replacement therapy are reducing the symptoms of vasomotor, reducing the risk of osteoporosis, reducing the risk of cardiovascular disease, improving the symptoms of urogenital, and improving the person's quality of life. If I had a friend that was considering to receive hormone replacement therapy, I would recommend my friend to really think about. My friend has to research all the information there are about hormone replacement therapy. My friend has to pay close attention to the risks and benefits of hormone replacement therapy. The articles that she reads about hormone replacement therapy should have studies that have accurate information. It will be a good idea that my friend goes to talk to someone who is a professional in hormone replacement therapy. I personally will tell my friend that I will first consider other options that are natural. It is good to consider if it is worth the risks from receiving the hormone replacement therapy. It will be great to talk to other people who have received hormone replacement therapy and find out if it was worth receiving the hormone replacement therapy.

4. In an article name " better fathers have smaller testicles" by Sarah Zhang is exactly what the name of the article is about. In a research that was published in the website of *Proceedings of the National Academy of Sciences* , it discovered that men with smaller testes who are fathers are more

involved in their child care and have a more responsive brain when looking at their child in pictures. In a study with male chimpanzees that have testes that are twice as big compared to humans, they did not demonstrate paternal care to their child. In a study with male gorillas that have small testes, they demonstrated that they provide paternal care for their child. A study run by James Rilling got seventy fathers that have children that are between one and two years old of age. Both parents did a survey to rate the father's involvement in their child care. The researchers also did an MRI scan in the men's brain and testes. As a father is more involve with their child care, their testosterone level changes. The female partners that rated their male partner as a good dad, showed more activity in the ventral tegmental area of the brain when they saw pictures of their kids. The female partners that rated their male partner as a good dad has smaller testes. The female partners that rated their male partner as less involve with their child care, showed less activity in the ventral tegmental area of the brain when they saw pictures of their kids. The female partners that rated their male partner as less involve with their child care has bigger testes. James Rilling wants to do a study to find out how the size of the testes is affected by genetics or having an absent dad.

An article name " Man, 66, goes to doctor and finds he's a woman" from the *South China Morning Post of Hong Kong* website is exactly what the name of article is about. A man who was sixty-six years old went to the Kwong Wah and Queen Elizabeth hospital because his abdomen was swelling. The doctors found out that the swelling in the abdomen was because he had a cyst on his ovary. This discovery meant that this patient is actually a man.

This person looked like a man because of the combination of two rare genetic disorders, which are Turner syndrome and congenital adrenal hyperplasia. There has only been known of six cases that have these two rare genetic disorders. The other people with this same rare genetic disorders was detected earlier in their life's than later in their life's like as this patient. The Turner syndrome makes female have an absence of some of the female features and not be able to get pregnant. The congenital adrenal hyperplasia cause an increase in the male hormones. This 1.37 meters tall man is an orphan who has a beard, small penis, and no testes. He wants to be consider as a male and has decided that maybe he will want to get male hormone.