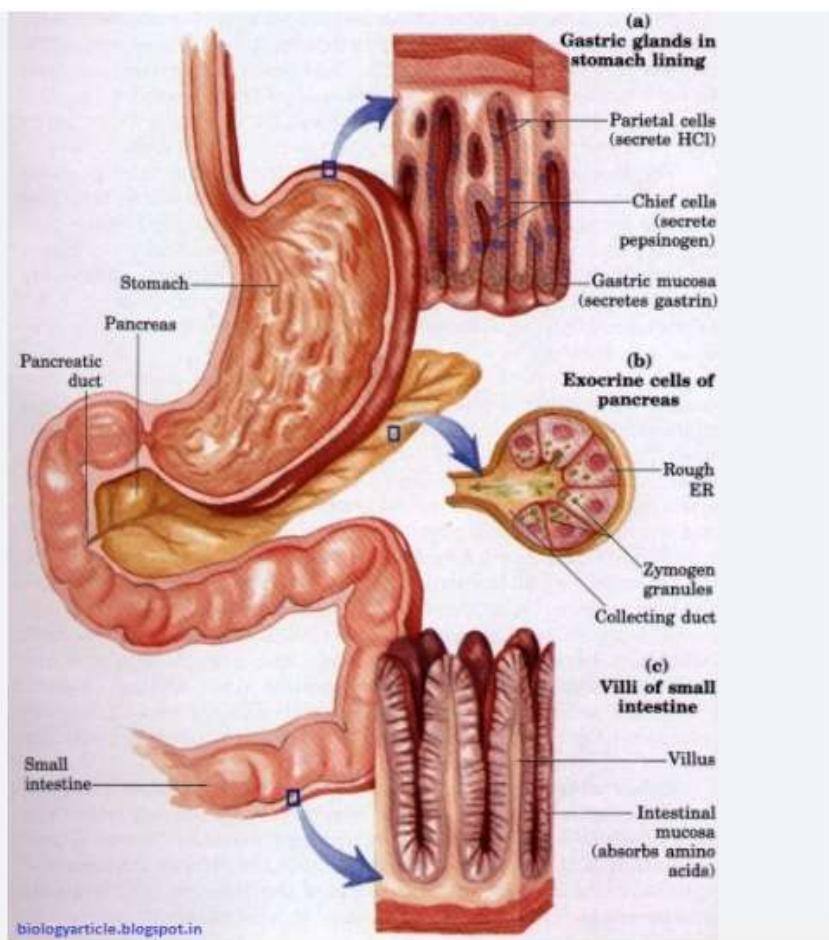


Acidity.....



Introduction

- Acidity occurs when the **gastric glands** produce a large amount of hydrochloric acid, more than what is needed for the digestion process.
- It is a common problem which many people suffer from, and occurs when a person suffers from heartburn, and also when formation of gas takes place in the stomach.
- The hydrochloric acid helps in the digestion of food, but when released in excess, it starts affecting the inner lining of the stomach. This causes an acidic stomach.
- If not treated promptly, the person may experience severe indigestion, gout, arthritis, and the formation of ulcers in the mouth or on the inner walls of the stomach.
- When acidity takes place, the gastric juices move from the stomach to the lower oesophagus or the food pipe, in turn making it dysfunctional.



Causes of Acidity

- Consumption of food containing excess fat
- Stress
- Excessive consumption of alcohol, and smoking
- Spicy foods
- Excessive consumption of caffeine
- Staying on empty stomach for a very long time
- Too much of junk food, and following an unhealthy diet
- Pregnancy, obesity, and old age



Spicy Foods



Stress



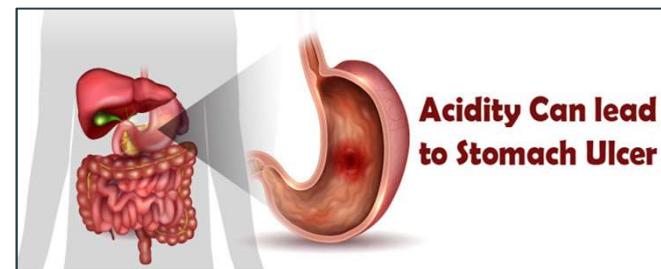
Junk Food



Alcohol

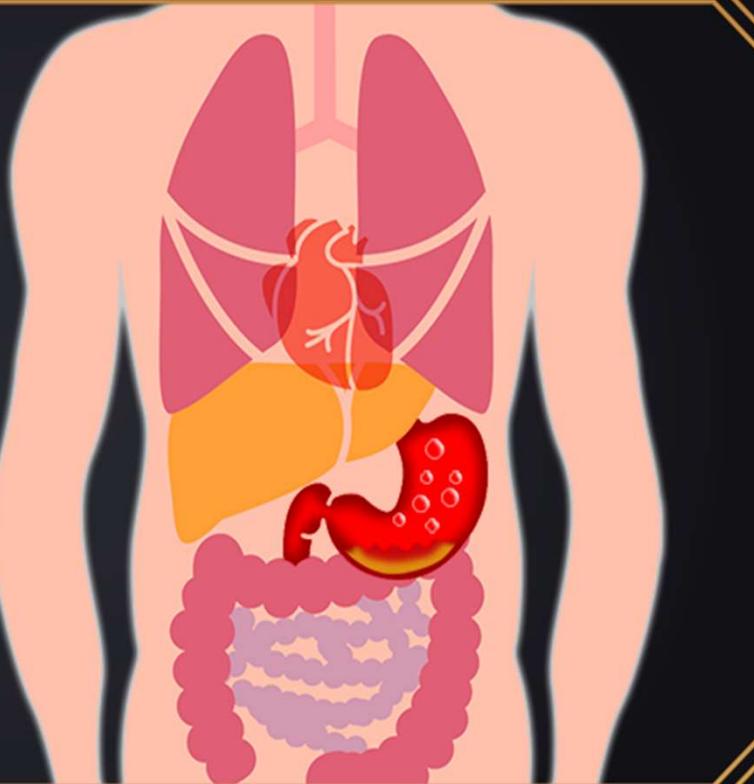
Symptoms of Acidity

- During heartburn, the person experiences a burning pain in the chest, just behind the sternum. This usually happens at night while the person is sleeping.
- Ulcers can form in both the mouth and the oesophagus tube. Ulcers in the mouth frequently make it difficult for a person to speak clearly.
- Appetite becomes poor.
- A severe or minor burning sensation is felt in the upper part of the stomach. This is known as **dyspepsia**.
- Respiratory problems are accompanied by frequent coughing.



ACIDITY SYMPTOMS :-

1. Burning in the stomach
2. Burning in the throat
3. Restlessness
4. Belching
5. Nausea
6. Sour taste
7. Indigestion
8. Constipation



Preventions

- Eat healthy and slowly
- Change your eating pattern
- Avoid sleeping with a full stomach
- Stay fit
- Increase water intake
- Avoid tea, coffee
- Limit alcohol intake
- Quit smoking
- Change your sleeping posture



Treatment

There are several stomach acidity cures available in the market as well as in your home. You can take eno or antacid like milk of magnesia. Milk of magnesia is alkaline, which means that it would neutralize any acidic substance encountered. Hence, it is an excellent antacid. It neutralizes excess stomach acid or hydrochloric acid.



ENO

The most common symptom is a burning sensation in the centre of the chest.³

This sensation sometimes spreads to the throat, and there may also be a sour, bitter taste in the throat.^{2,3}

*Creative visualization

A green background featuring a white silhouette of a human figure in profile. Inside the silhouette, the esophagus and stomach are depicted in blue. A red circle with a flame icon is placed over the heart area, and a blue circle with a flame icon is placed over the upper stomach area, indicating the locations of heartburn symptoms.

Home treatment

NATURAL REMEDIES TO CURE ACIDITY AND HEARTBURN



BANANAS:
Prevent acid formation



COLD MILK:
Helps maintain pH balance



GOOSEBERRIES:
Soothe stomach lining



FENNEL SEEDS:
Prevent Bloating



BUTTERMILK:
Aids digestion



BASIL LEAVES:
Stimulate mucous production



PINEAPPLE JUICE:
Prevents acid reflux



RAW ALMONDS:
Neutralize stomach acid



MINT LEAVES:
Are a natural coolant



GARLIC:
Beneficial in gastroenteritis



GINGER:
Minimizes stomach inflammation

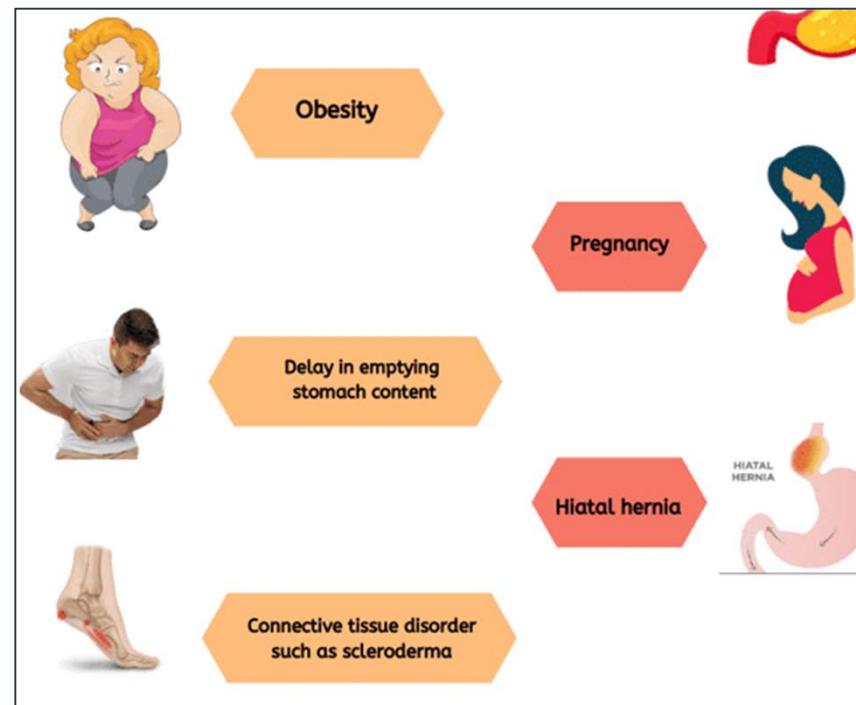
Diagnosis of Acidity

- Endoscopy - camera imaging
- Biopsy - taking a tissue sample for laboratory analysis
- Barium X-ray - imaging the esophagus, stomach, and upper duodenum after swallowing a chalky liquid that helps provide contrast on images
- Esophageal manometry - pressure measurement of the esophagus
- Impedance monitoring - measuring rate of fluid movement along the esophagus
- pH monitoring - acidity testing

Risk Factors

Conditions that can increase your risk of Acidity include:

- Obesity
- hiatal hernia
- Pregnancy
- Smoking
- Dry mouth
- Asthma
- Diabetes
- Delayed stomach emptying
- Connective tissue disorders, such as scleroderma



Complications

- Narrowing of the esophagus (esophageal stricture)
- An open sore in the esophagus (esophageal ulcer)
- Precancerous changes to the esophagus (Barrett's esophagus).
- Other complications include asthma, pneumonia, hoarseness, laryngitis, and chest congestion.
- Dental abrasion
- Laryngeal cancer
- Chronic bronchitis
- Sleep apnoea
- Pulmonary fibrosis
- Chronic cough

CH419 CONSUMER CHEMISTRY PRESENTATION



WHAT IS A HAND SANITIZER?

A hand sanitizer is a liquid gel/foam which is applied to the hands to remove pathogens (disease causing microorganisms) from them.

It is thought to bring consumers some benefits of handwashing when handwashing is not practical.

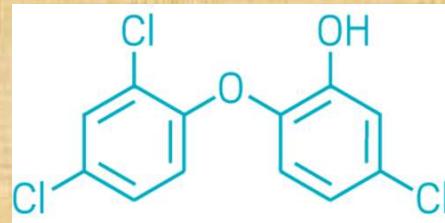
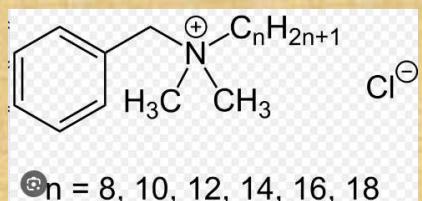


TYPES OF HAND SANITIZERS

❖ **ALCOHOL-BASED:** These sanitizers contain 60-95% alcohol usually in the form of isopropyl alcohol, ethanol or n-propanol. Presence of alcohol can kill most germs.



❖ **ALCOHOL-FREE:** They contain disinfectants such as benzalkonium chloride (BAC) or antimicrobial agents such as triclosan. They can reduce microbes but are less effective than alcohol.



GENERAL COMPOSITION OF AN ALCOHOL-BASED HAND SANITIZER

Emollients, polyacrylate, base, colors, and fragrance, <1%

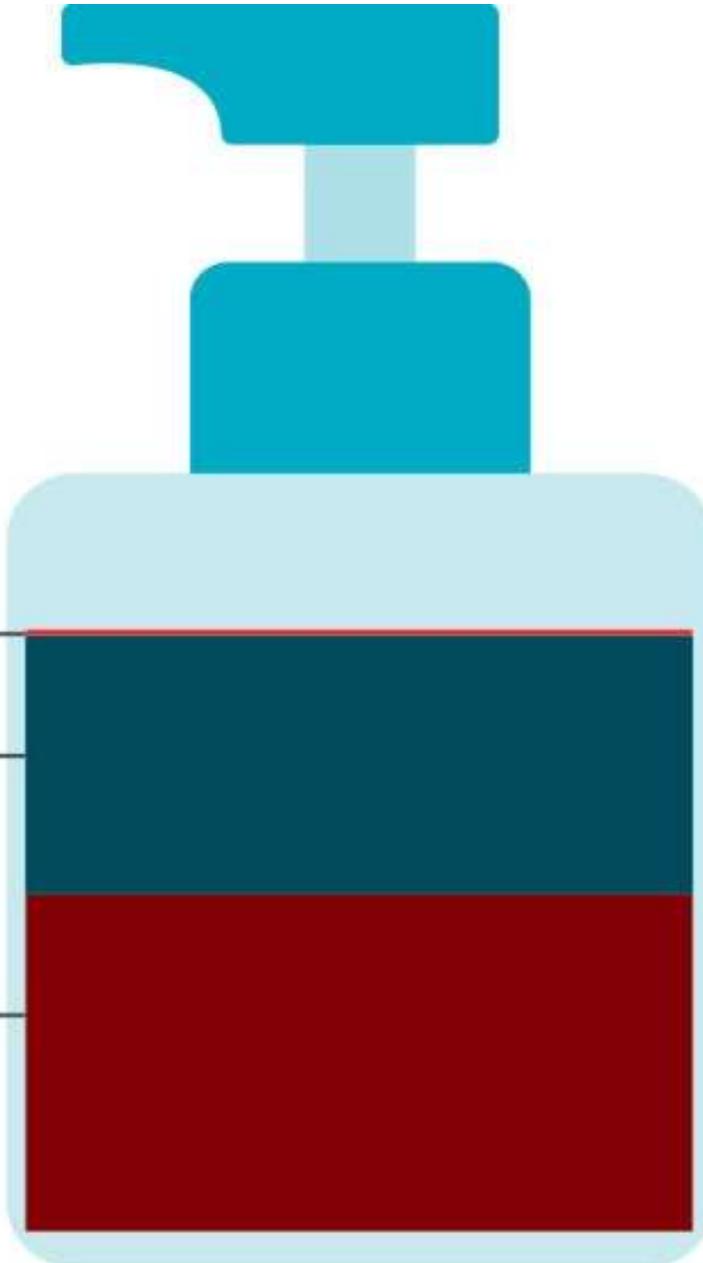
Emollients protect skin from alcohol's drying effects, polyacrylate makes a gel with water, the base neutralizes polyacrylate's acidic effects, and color and fragrance give the sanitizer its appearance and smell.

Water, <40%

Water acts as a carrier for the ingredients and part of the hydrogel.

Alcohol, >60%

Alcohol breaks apart the lipid-based coatings of some bacteria and viruses, destroying them.





HOW TO USE?

To ace the game of hand sanitizer usage, rub it thoroughly over finger and hand surfaces (of both hands evenly) for a period of 30 seconds, followed by complete air-drying

SAFETY CONCERNS

FOR ALCOHOL-BASED SANITIZERS:

- Product flammability
- Ingestion

FOR ALCOHOL-FREE SANITIZERS:

- Antimicrobial compounds can interfere with the function of endocrine system.
- Environmental contamination (by triclosan)



SOAP V/S SANITIZER

Hand washing with soap and water is more effective than using alcohol-based hand sanitizers.

Alcohol-based sanitizers can't remove all types of germs such as norovirus, cryptosordium, and clostridium difficile.



V/S



BENEFITS AND LIMITATIONS OF HAND SANITIZER

BENEFITS

- Convenient and portable
- Easy to use and less time consuming
- Help to prevent the spread of infectious diseases
- They can help prevent skin dryness

LIMITATIONS

- Alcohol-free sanitizers are less effective.
- Alcohol does not work in presence of visible dirt.
- Hand sanitizers are not cleansing agents.



WHICH SANITIZER TO USE TO PREVENT COVID-19?

Since the outbreak of COVID-19, sales of hand sanitizers has soared. With its increasing demand, pharmacies and supermarkets have started limiting the number that people can buy at one time.

Alcohol-based hand sanitizers are effective against coronavirus. It needs to be at least 60% alcohol to kill coronavirus.



CONCLUSION

Although hand sanitizers prevent the transmission of diseases, soap and water is the best way to eliminate all forms of infectious bacteria.

Overall, it is a good substance to use in infectious areas like hospitals and washrooms. It is a safe, effective, beneficial and overall a chemical-free process to stop the spread of diseases.



The end

Thank you.

Antidepressants



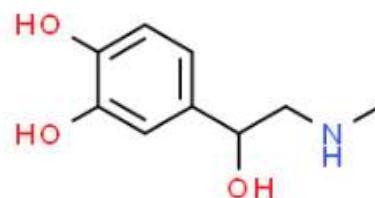
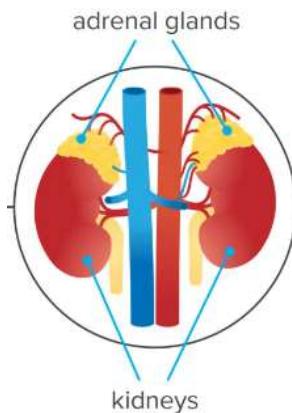


Our ancient brains evolved the perfect way to keep us safe by controlling the chemicals in our mind to moderate our behaviour.

The chemistry of emotions

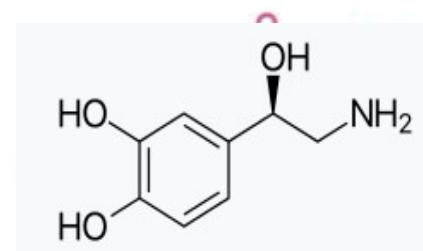
Where two neurons meet, a very small gap (synapse) exists between them. The electrical impulse travelling along the axon of the neuron must convert into a chemical signal to bridge this gap. The chemicals that do this are called neurotransmitters. These so-called chemical messengers are involved in our different responses to situations.

Your emotions depend on fluctuating levels of neurotransmitters, which cause the activation of different parts of the brain responsible for different moods, or activate parts of the brain that trigger the stimulation of the autonomic nervous system.



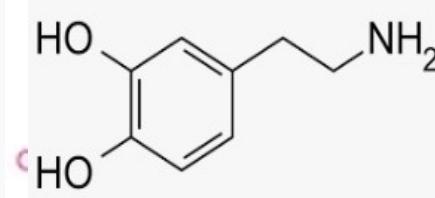
Adrenaline

Released by the adrenal glands that sit on top of each kidney, adrenaline increases the flow of blood to our muscles, raises our heart rate and dilates our pupils. It is crucial in our fight-or-flight survival response.



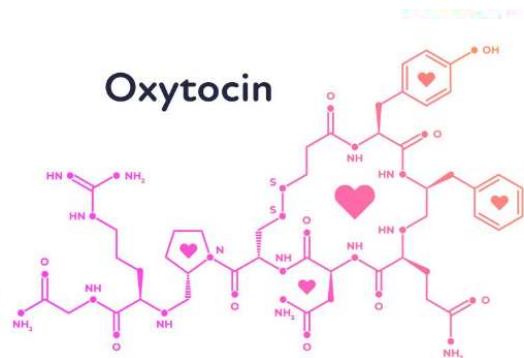
Noradrenaline

Similar to adrenaline, the release of this chemical can result in increased levels of alertness, helping to prime us for action if needed. It also increases our blood pressure and widens our air passages.



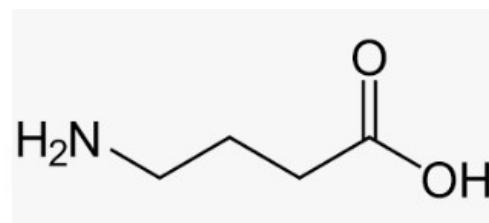
Dopamine

This is the addictive reward chemical that your brain craves. It serves to motivate you to seek out the things you need for your survival. We can sometimes find ourselves enslaved by this ancient reward mechanism.



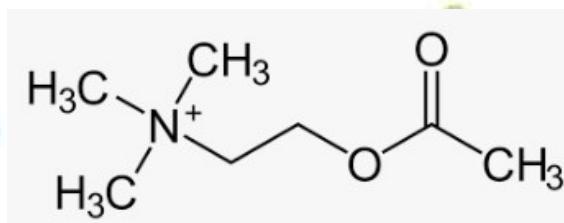
Oxytocin

Also known as the 'cuddle hormone', oxytocin is released when you're close to another person. It's essential for making strong social bonds, and it's also a key part of why we want to trust people.



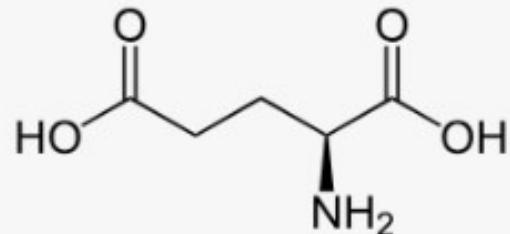
GABA

Responsible for regulating muscle tone, gamma-Aminobutyric acid (GABA) also regulates the communication between brain cells. It can calm us down by reducing the rate at which our neurons fire.



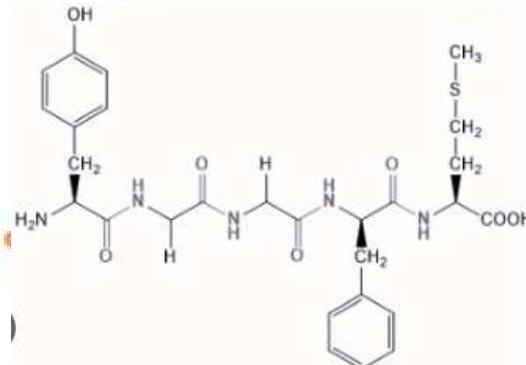
Acetylcholine

This is the main neurotransmitter in the parasympathetic nervous system that slows our heart rate, contracts smooth muscles, dilates blood vessels and increases bodily secretions.



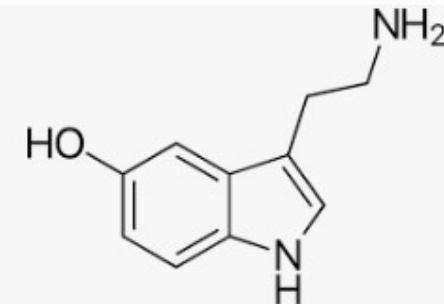
Glutamate

The most abundant neurotransmitter in the vertebrate nervous system, glutamate is used by nerve cells to transmit signals to other cells. Too much of it can cause cognitive impairments.



Endorphins

Triggered by the sensation of pain, endorphins work to inhibit the transmission of pain signals. Capable of producing a sense of euphoria, studies have suggested endorphins may also be stimulated by laughter.



Serotonin

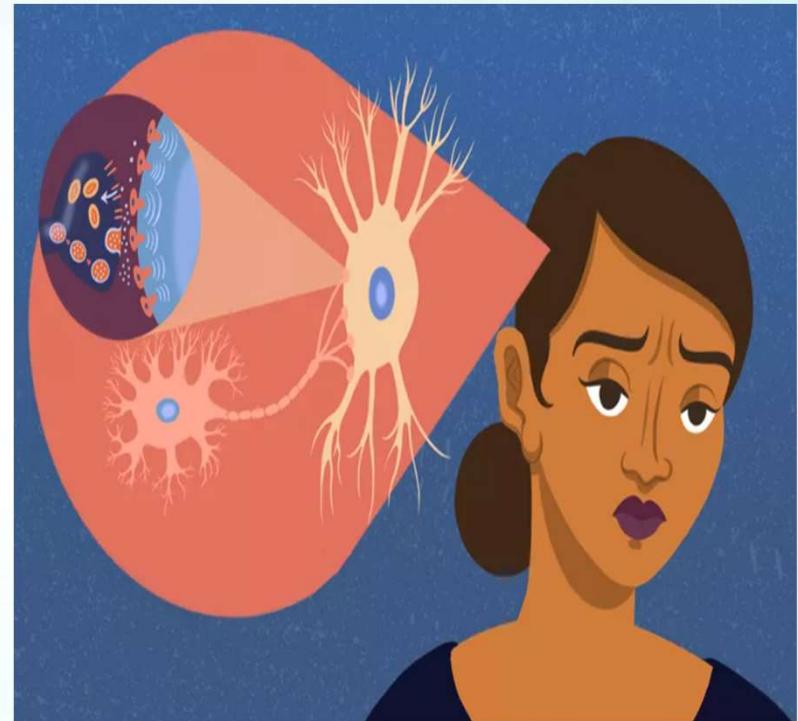
Serotonin is linked to our wellbeing and happiness, and our levels of it are affected by exercise and exposure to sunlight. It also helps to regulate our mood balance, sleep cycle and digestion.

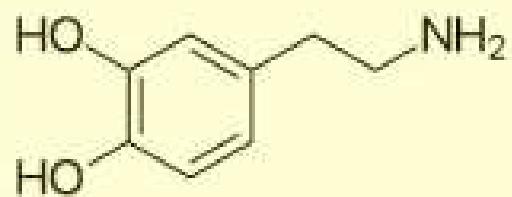
Chemistry behind depression

The cause of depression is not fully understood yet, it's an area of ongoing research.

However chemical imbalance model suggest that there is a deficiency of certain **neurotransmitters** (chemical messengers) at synapses, or tiny gaps, between neurons which interferes with the transmission of nerve impulses, causing or contributing to depression.

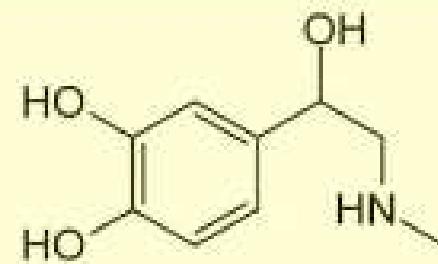
Serotonin, norepinephrine and dopamine are widely considered to be the neurotransmitters which play an important role in regulating the mood, imbalance of which causes depressive symptoms.



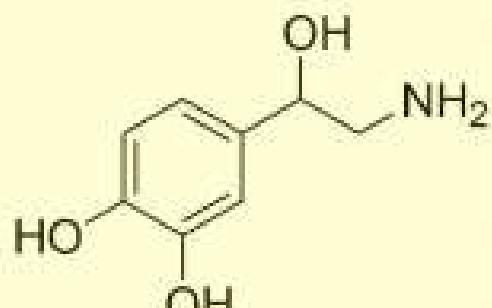


dopamine

catecholamines

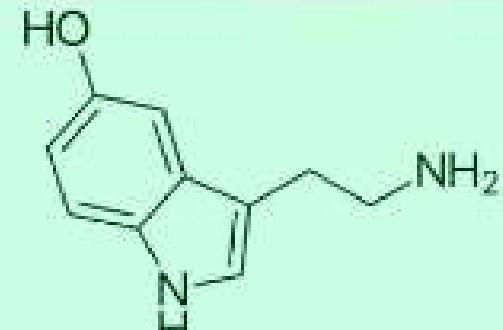


epinephrine



norepinephrine

indolamine



serotonin

Serotonin, Norepinephrine and Dopamine

Serotonin: It plays a role in mood and the CNS and affects functions throughout the body.

Norepinephrine: Norepinephrine is a neurotransmitter and hormone that responds to stress and low blood pressure. It also plays a role in managing our ability and your ability to focus

Dopamine: Dopamine plays a role in how we feel pleasure. It's a big part of our unique human ability to think and plan. It helps us strive, focus, and find things interesting

GET YOUR DAILY D.O.S.E. OF HAPPINESS

The happy brain chemicals that make you feel good



What are antidepressants.....?

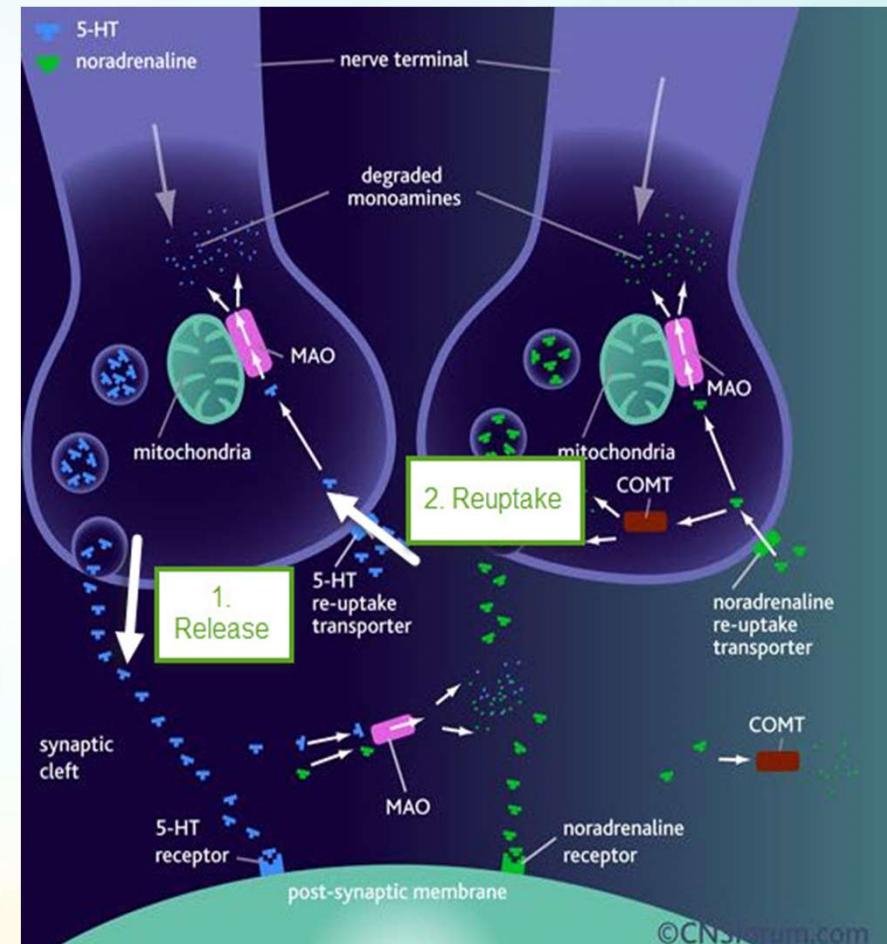
Antidepressants are medications that can help relieve symptoms of depression, social anxiety disorder, anxiety disorders, seasonal affective disorder, and dysthymia, or mild chronic depression, as well as other conditions.



Types of Antidepressants

Antidepressants work by changing the levels of brain chemicals by **blocking reabsorption**. Blocking reabsorption of specific neurotransmitters increases the level available for your nerves to use. This will activate your nerve receptors for a longer time.

1. Selective serotonin reuptake inhibitors (SSRIs)
2. Serotonin-norepinephrine reuptake inhibitors (SNRIs)
3. Tricyclic antidepressants and Others

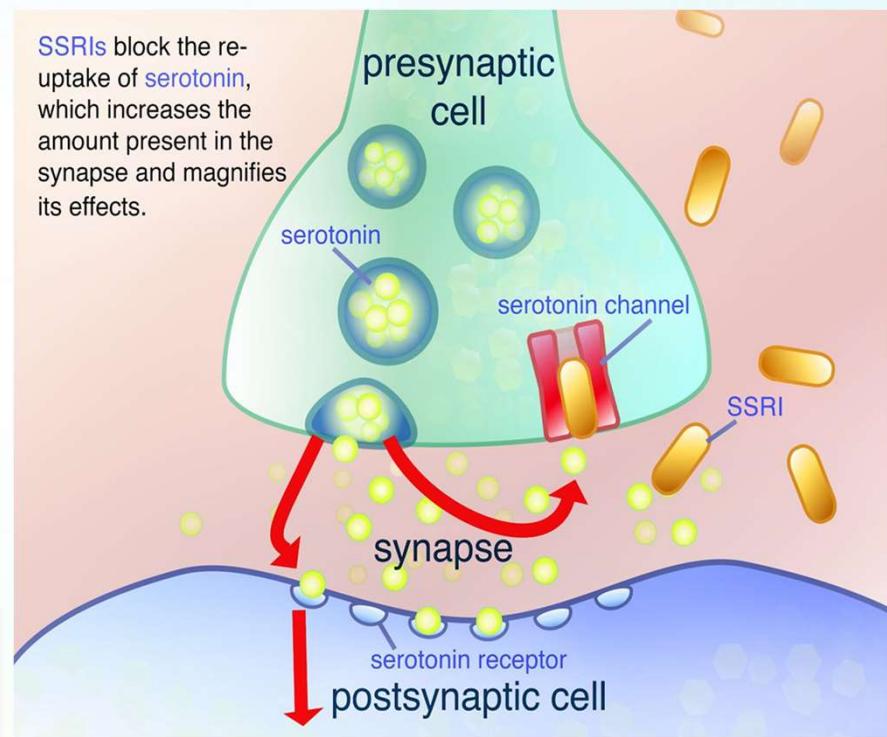
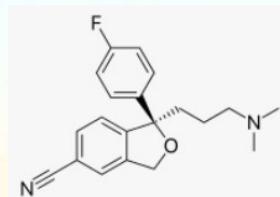
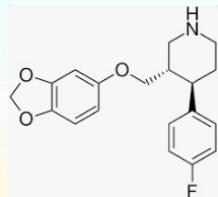
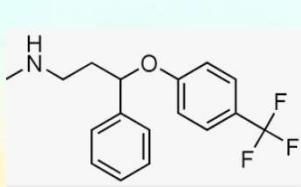


©CNSIguru.com

Selective serotonin reuptake inhibitors (SSRIs).

SSRIs work by blocking the reabsorption of serotonin. Once serotonin has been released into the synapse and relayed its message, the majority is reabsorbed into the first nerve cell for reuse later. **SSRIs prevent serotonin from being reabsorbed**. In this way, they ensure that serotonin hangs around in the synapse for a longer time thus, exerting more of an effect.

Examples are fluoxetine (Prozac), paroxetine (Paxil), and citalopram (Celexa).

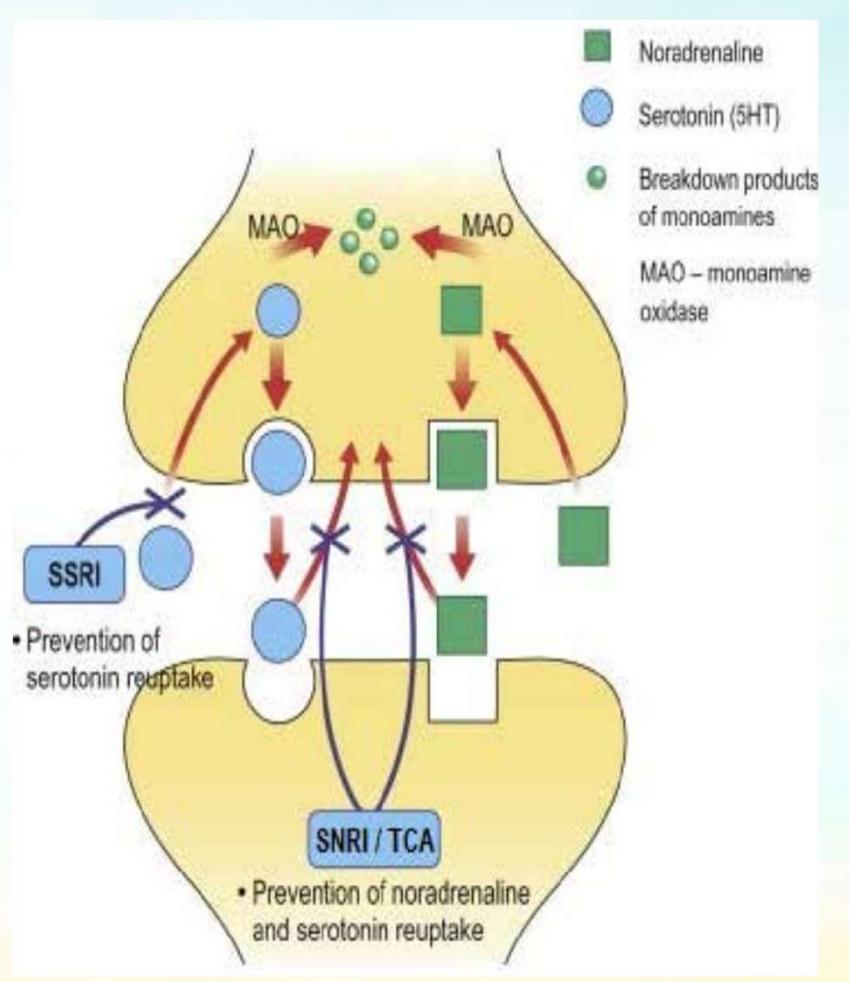
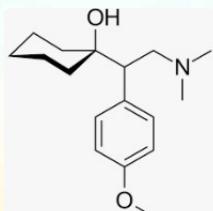
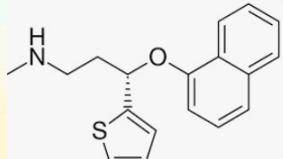


Serotonin-nor-epinephrine reuptake inhibitors (SNRIs)

SNRIs work by blocking the reabsorption of both serotonin and norepinephrine, leading to increased levels of these two chemicals in the brain.

Serotonin is sometimes called a “**feel-good**” **chemical** because it’s associated with positive feelings of well-being. Norepinephrine is related to alertness and energy

Examples include duloxetine (Cymbalta) and venlafaxine (Effexor XR).



Side effects of SNRIs and SSRIs

Serotonin Syndrome

Serotonin syndrome occurs when there is an excessive accumulation of serotonin in our body. It can be caused when there is an overdose drugs or when two medications containing serotonin are used simultaneously.

Hypo“natremia”

Elderly people who take SSRIs may experience a severe fall in sodium (salt) levels known as hyponatremia. This may lead to a buildup of fluid inside the body's cells, which can be potentially dangerous. This side effect occurs because SSRIs can block the effects of a hormone that helps to regulate levels of sodium and fluid in the body

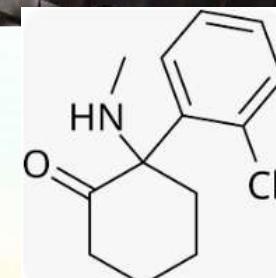


Older drugs used for treatment

- **Tricyclic antidepressants (TCAs)** : TCAs block the reabsorption of noradrenaline and serotonin. Examples are imipramine(Tofranil) and nortriptyline (Pamelor).
- **Norepinephrine-dopamine reuptake inhibitors (NDRIs)** : NDRIs, such as bupropion(Wellbutrin), block reabsorption of the neurotransmitters norepinephrine and dopamine.
- **Monoamine oxidase inhibitors (MAOIs)** :MAOIs block the reabsorption of norepinephrine, serotonin, and dopamine. These medications, including isocarboxazid (Marplan) and phenelzine (Nardil).

Drugs in trial for treatment

Certain drugs which are normally used as recreational substances like MDMA, ketamine and marijuana are being explored as potential drugs for treating depression. The exact mechanism of action of those drugs is not yet known and is a topic of research. In particular MDMA has shown promising results in clinical trials.



W Wikipedia
Ketamine - Wikipedia

Antidepressants



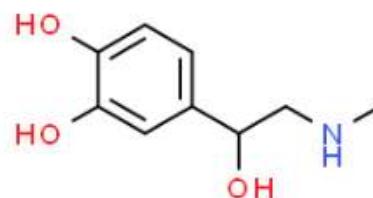
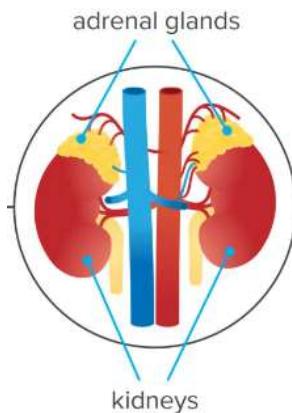


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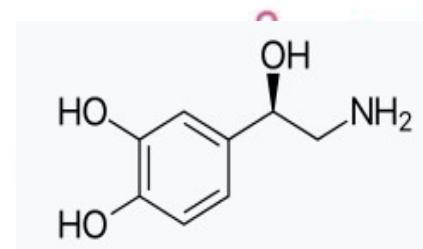
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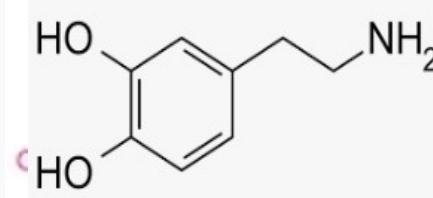
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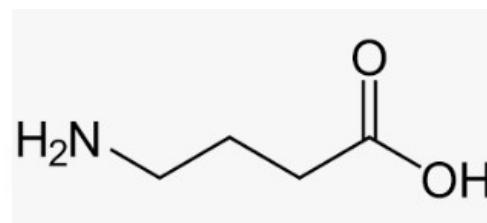
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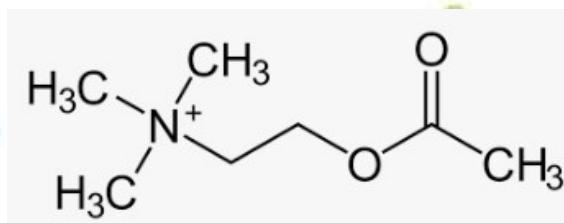
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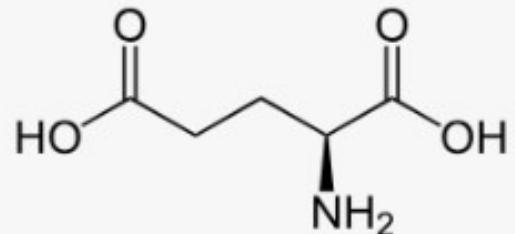
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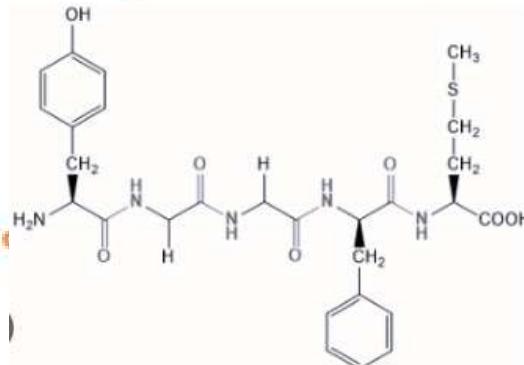
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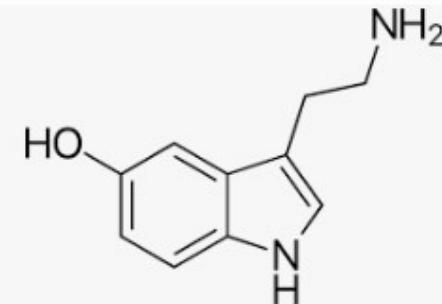
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Serotonin

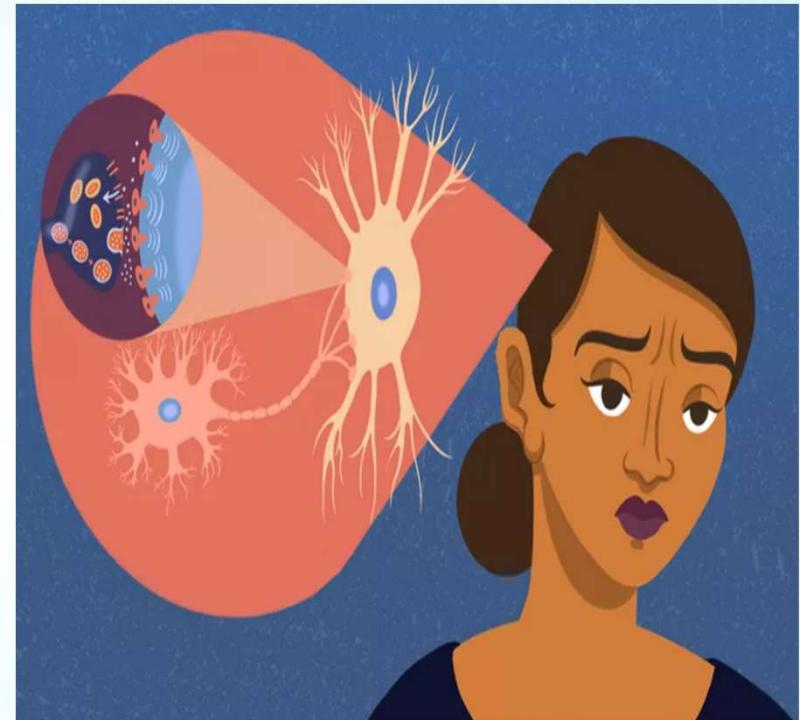
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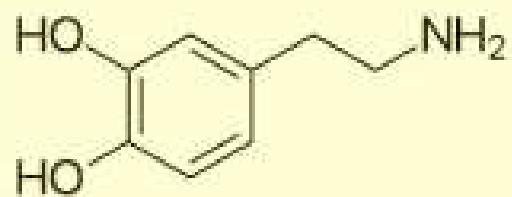
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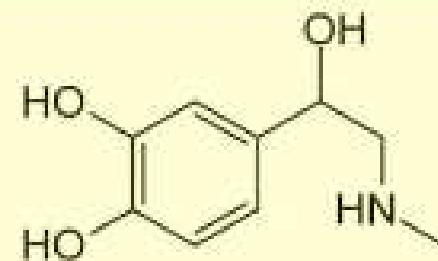
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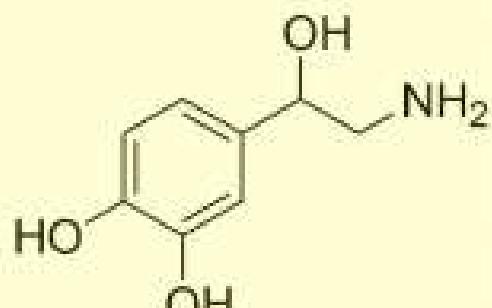


dopamine

catecholamines

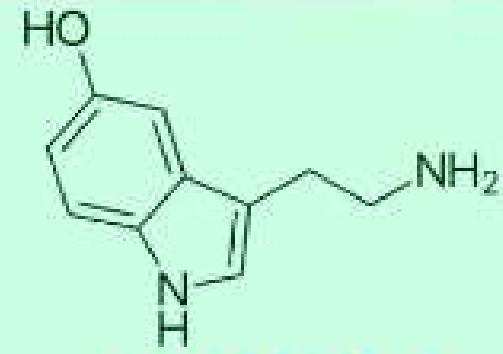


epinephrine



norepinephrine

indolamine



serotonin

Serotonin, Norepinephrine and Dopamine

Serotonin: It plays a role in mood and the CNS and affects functions throughout the body.

Norepinephrine: Norepinephrine is a neurotransmitter and hormone that responds to stress and low blood pressure. It also plays a role in managing our ability and your ability to focus

Dopamine: Dopamine plays a role in how we feel pleasure. It's a big part of our unique human ability to think and plan. It helps us strive, focus, and find things interesting

GET YOUR DAILY D.O.S.E. OF HAPPINESS

The happy brain chemicals that make you feel good



What are antidepressants.....?

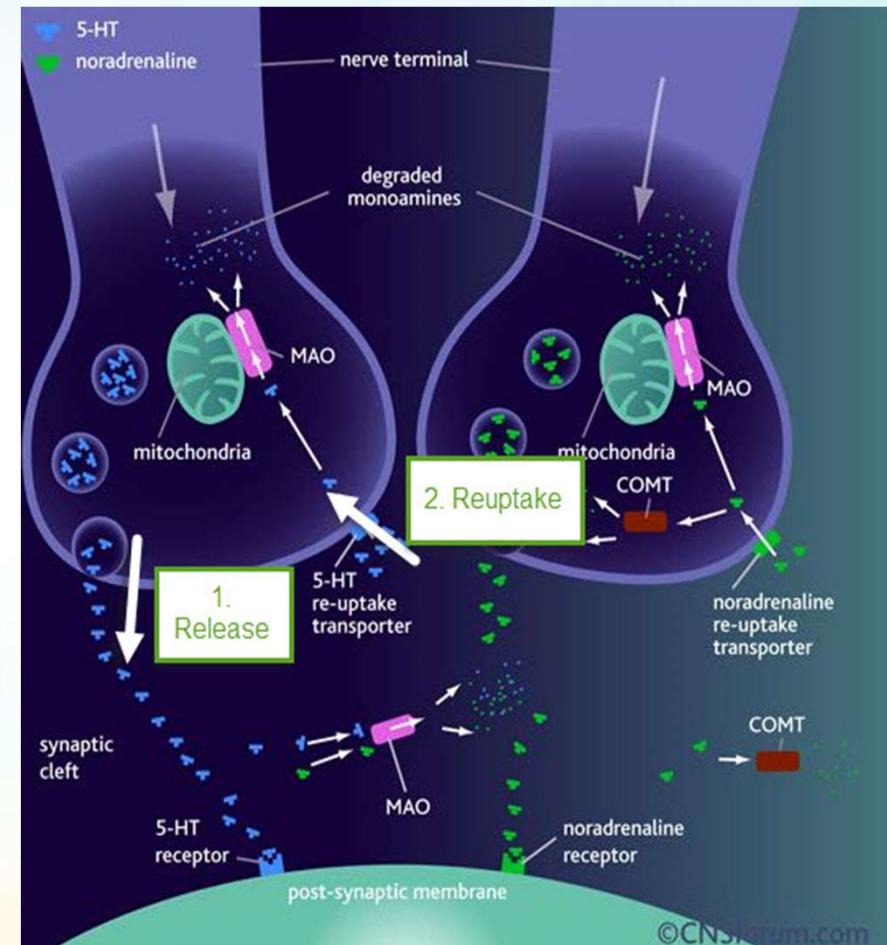
Antidepressants are medications that can help relieve symptoms of depression, social anxiety disorder, anxiety disorders, seasonal affective disorder, and dysthymia, or mild chronic depression, as well as other conditions.



Types of Antidepressants

Antidepressants work by changing the levels of brain chemicals by **blocking reabsorption**. Blocking reabsorption of specific neurotransmitters increases the level available for your nerves to use. This will activate your nerve receptors for a longer time.

1. Selective serotonin reuptake inhibitors (SSRIs)
2. Serotonin-norepinephrine reuptake inhibitors (SNRIs)
3. Tricyclic antidepressants and Others

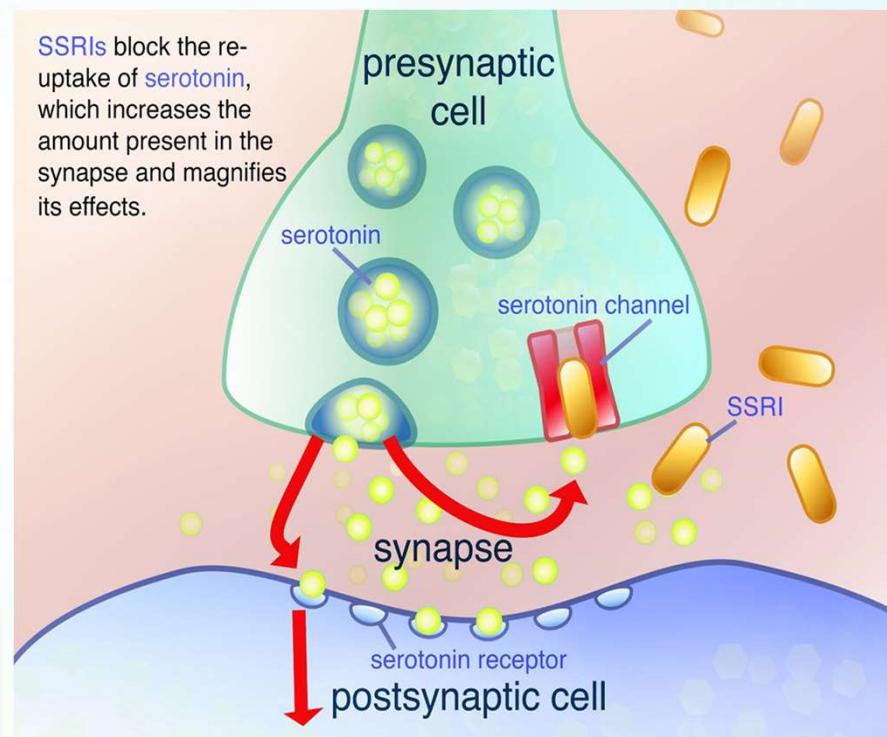
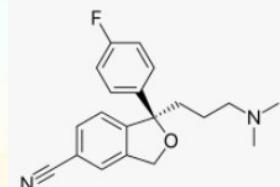
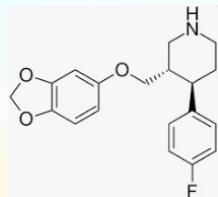
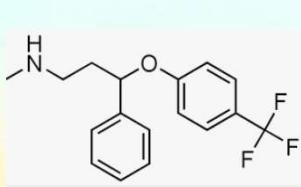


©CNSIguru.com

Selective serotonin reuptake inhibitors (SSRIs).

SSRIs work by blocking the reabsorption of serotonin. Once serotonin has been released into the synapse and relayed its message, the majority is reabsorbed into the first nerve cell for reuse later. **SSRIs prevent serotonin from being reabsorbed**. In this way, they ensure that serotonin hangs around in the synapse for a longer time thus, exerting more of an effect.

Examples are fluoxetine (Prozac), paroxetine (Paxil), and citalopram (Celexa).

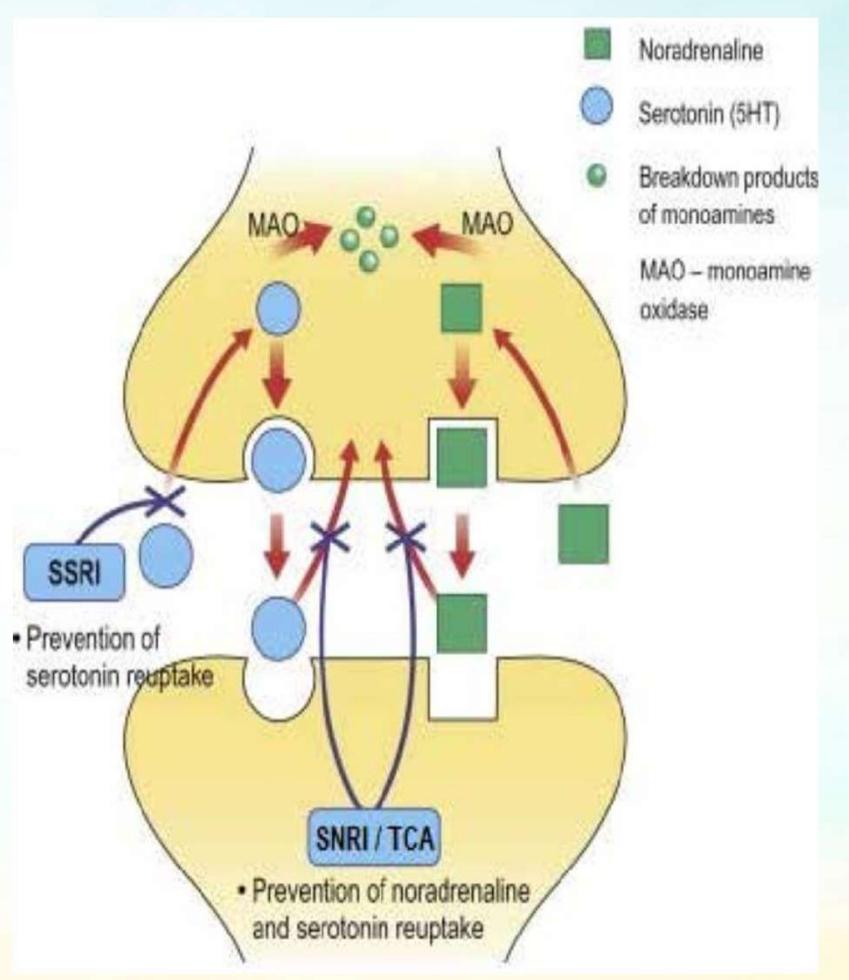
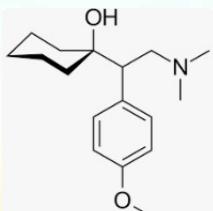
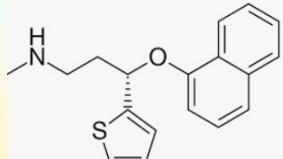


Serotonin-nor-epinephrine reuptake inhibitors (SNRIs)

SNRIs work by blocking the reabsorption of both serotonin and norepinephrine, leading to increased levels of these two chemicals in the brain.

Serotonin is sometimes called a “**feel-good**” **chemical** because it’s associated with positive feelings of well-being. Norepinephrine is related to alertness and energy

Examples include duloxetine (Cymbalta) and venlafaxine (Effexor XR).



Side effects of SNRIs and SSRIs

Serotonin Syndrome

Serotonin syndrome occurs when there is an excessive accumulation of serotonin in our body. It can be caused when there is an overdose drugs or when two medications containing serotonin are used simultaneously.

Hypo“natremia”

Elderly people who take SSRIs may experience a severe fall in sodium (salt) levels known as hyponatremia. This may lead to a buildup of fluid inside the body's cells, which can be potentially dangerous. This side effect occurs because SSRIs can block the effects of a hormone that helps to regulate levels of sodium and fluid in the body

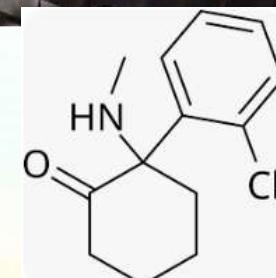


Older drugs used for treatment

- **Tricyclic antidepressants (TCAs)** : TCAs block the reabsorption of noradrenaline and serotonin. Examples are imipramine(Tofranil) and nortriptyline (Pamelor).
- **Norepinephrine-dopamine reuptake inhibitors (NDRIs)** : NDRIs, such as bupropion(Wellbutrin), block reabsorption of the neurotransmitters norepinephrine and dopamine.
- **Monoamine oxidase inhibitors (MAOIs)** :MAOIs block the reabsorption of norepinephrine, serotonin, and dopamine. These medications, including isocarboxazid (Marplan) and phenelzine (Nardil).

Drugs in trial for treatment

Certain drugs which are normally used as recreational substances like MDMA, ketamine and marijuana are being explored as potential drugs for treating depression. The exact mechanism of action of those drugs is not yet known and is a topic of research. In particular MDMA has shown promising results in clinical trials.



W Wikipedia
Ketamine - Wikipedia



CH419:CONSUMER CHEMISTRY PRESENTATION

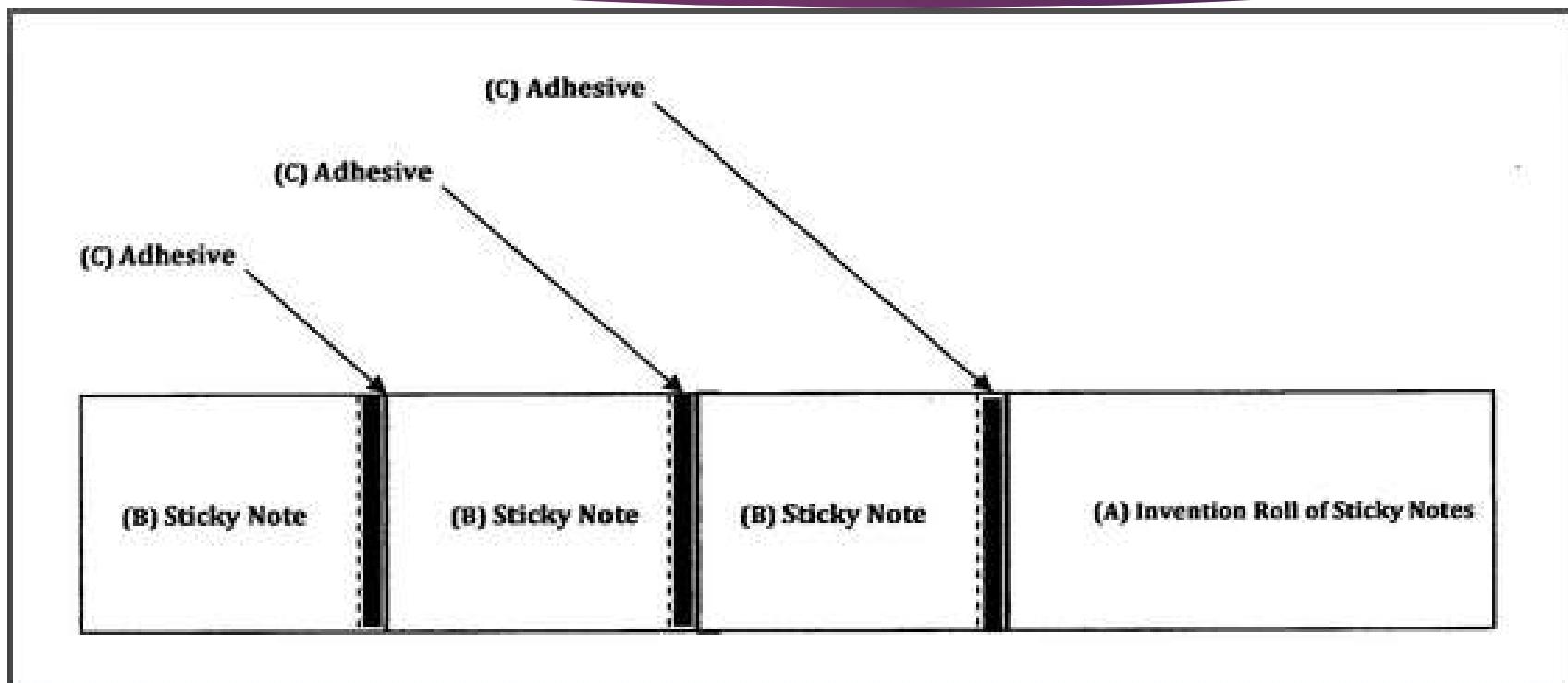
TOPIC : Post-it Notes

Post-it Notes

- ▶ A small piece of paper with a strip of low-tack adhesive on the back.
- ▶ Can be temporarily attached to documents ,walls etc.
- ▶ Idea first conceived in 1974
- ▶ Idea by – Arthur Fry
- ▶ While he was working for 3M company



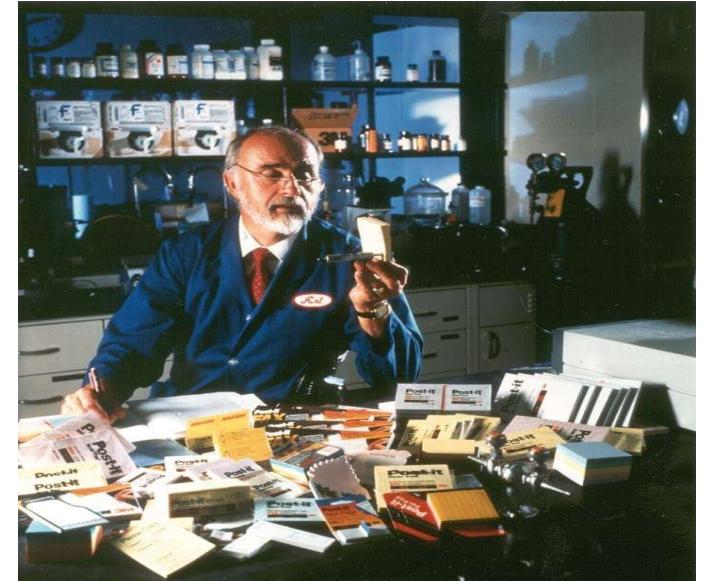
Physical structure of a Post-it note



History....

In 1968...

- ▶ Spencer Silver, a chemist was searching for new , super-strong adhesive.
- ▶ Mixed organic molecules to non standard proportions.
- ▶ **Result:** "inherently tacky elastomeric copolymer microspheres".
- ▶ accidentally created a "**low-tack", reusable, pressure-sensitive adhesive.**
- ▶ Or Simply, a glue that didn't stick very well.



Spencer Silver

Pressure Sensitive Adhesives (PSA)

- ▶ A PSA is a sticky, viscous, liquid-like material that adheres to a surface using only pressure.
- ▶ PSA are 'sticky' or 'tacky' because they are high viscous liquids with some elasticity or technically termed as **Viscoelastic**.
- ▶ There are two fundamentally different components of tape's sticky nature; **adhesion** and **cohesion**.
- ▶ **Adhesion is the binding force between two different materials**, whereas **cohesion is the binding force between two similar materials**.
- ▶ To function well, it should have good adhesion to a surface and good cohesion, or internal strength.

COHESION VERSUS ADHESION

Cohesion is the attraction force between molecules of the same substance

An intermolecular attraction

Includes Van Der Waal forces and hydrogen bonding

The formation of water droplets on the surface tension of a liquid is due to cohesion

Adhesion is the attraction force between different molecules

An intramolecular attraction

Includes electrostatic attractions

The spreading of a liquid on a solid surface is due to adhesion

Visit www.pediatra.com

Adhesion vs Cohesion

Adhesion

Different molecules attract each other



Tape sticks to paper because of adhesion.

Cohesion

Like molecules attract each other



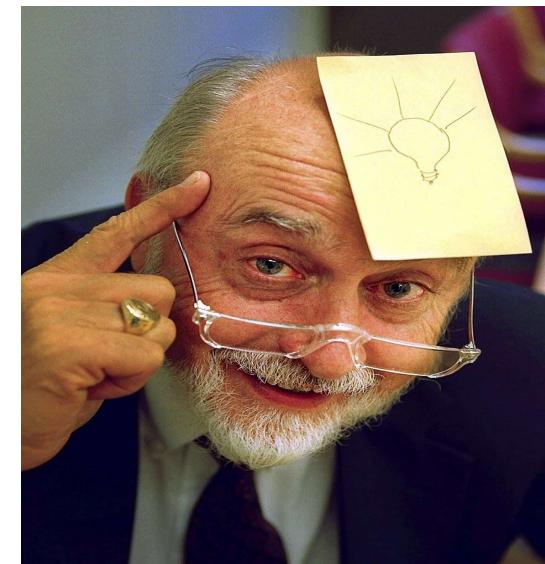
Mercury forms beads on surfaces because of cohesion.

A glue that did not stick well

- ▶ Was it a Failure ?
- ▶ It was unique.
- ▶ There were many challenges.
- ▶ Hard to come up with a practical application.
- ▶ Scientifically Interesting.

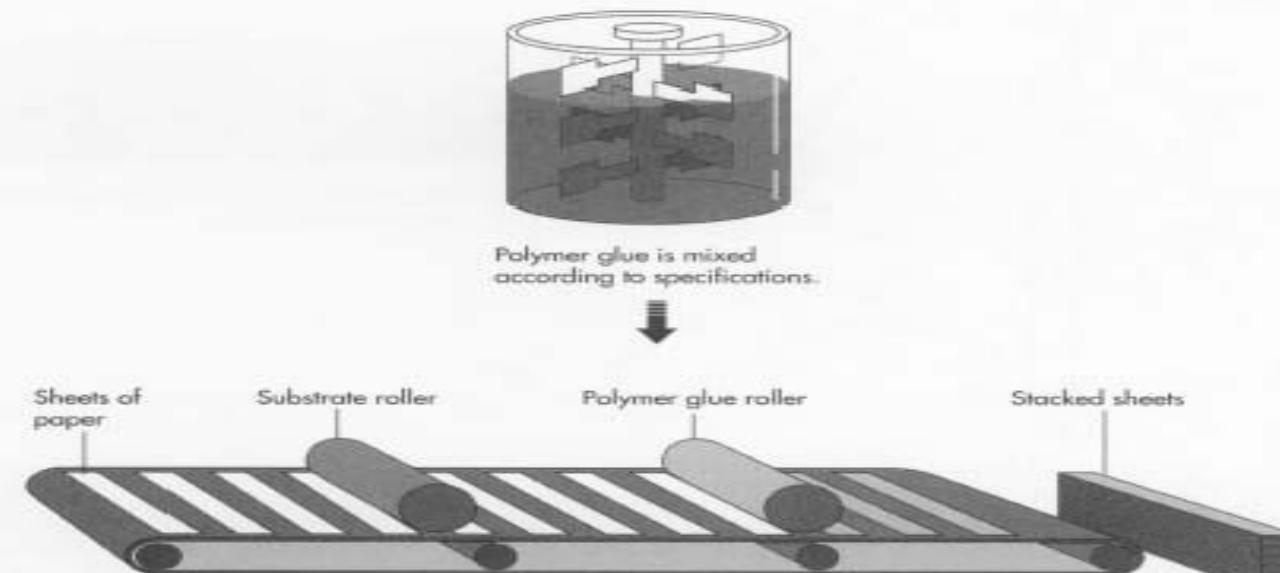
1974..

- ▶ Arthur Fry a 3M employee.
- ▶ No use of the adhesive until Arthur's idea.
- ▶ Used as a way of holding bookmarks in his hymnal while singing in the church.
- ▶ 3M company wasn't sure about the profitability of post-it notes.
- ▶ But ,in 1980 the product was introduced to the world.



Arthur Fry

Manufacturing Process



Uses of Post-it Notes

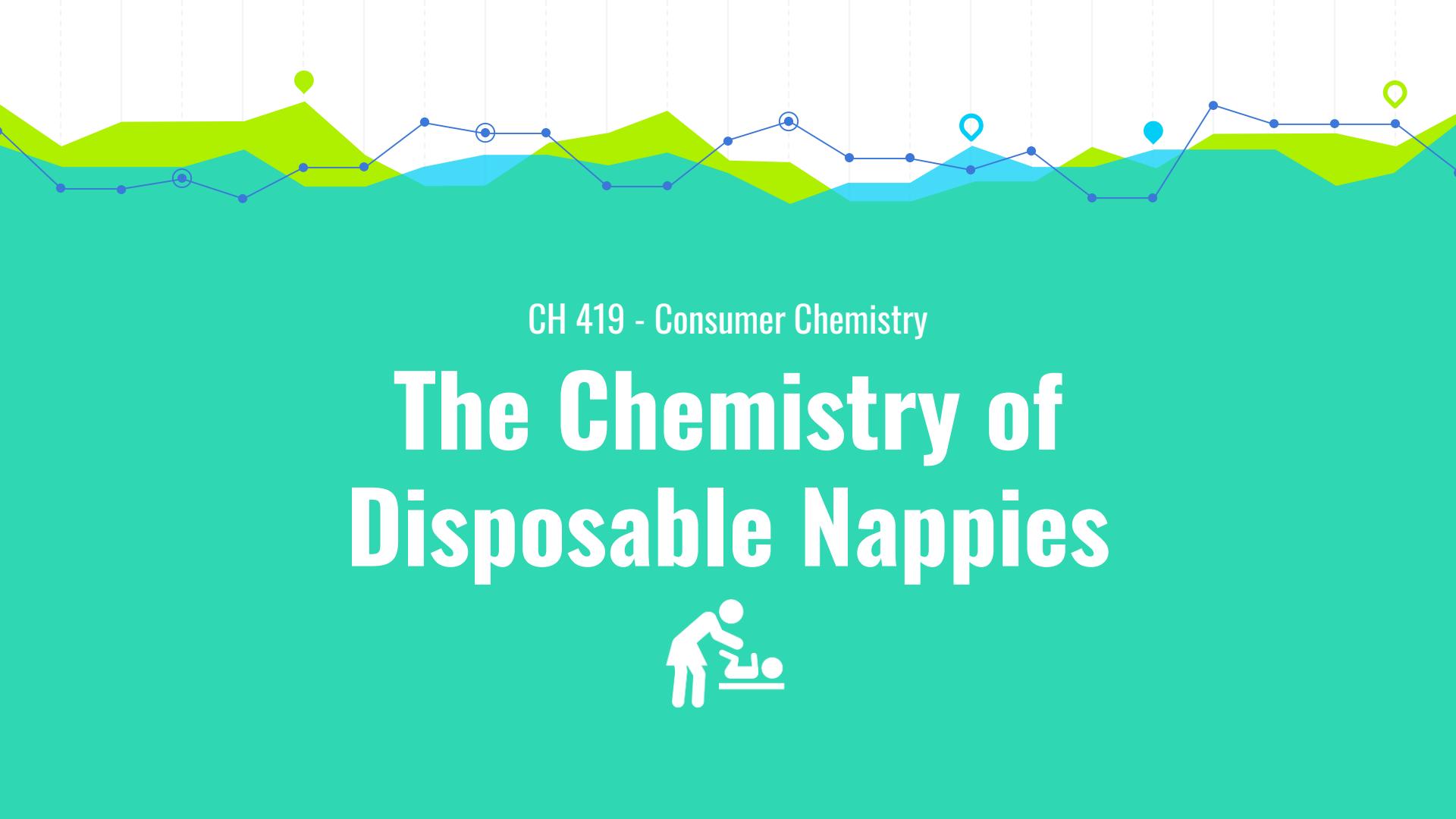
- ▶ Inspire spontaneity, rapid ideation, free association.
- ▶ Can be used to make context sensitive notes in documents.
- ▶ Effective medium of communication.
- ▶ Help in organization of data and documents.
- ▶ Collecting down ideas.
- ▶ Write down instructions.
- ▶ To write down memos and to-dos.
- ▶ To write notices.

An example: Medicine store

- ▶ Put a note on all new items coming to the store.
- ▶ Write agenda for the day.
- ▶ Pass on orders
- ▶ Leave instructions on the desktop of staff members.
- ▶ Display notices.

Post-it Notes Products

- ▶ Super sticky notes
- ▶ Popup notes
- ▶ Note pads
- ▶ Specially notes
- ▶ Portable flags



CH 419 - Consumer Chemistry

The Chemistry of Disposable Nappies



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Introduction: Disposable Nappies

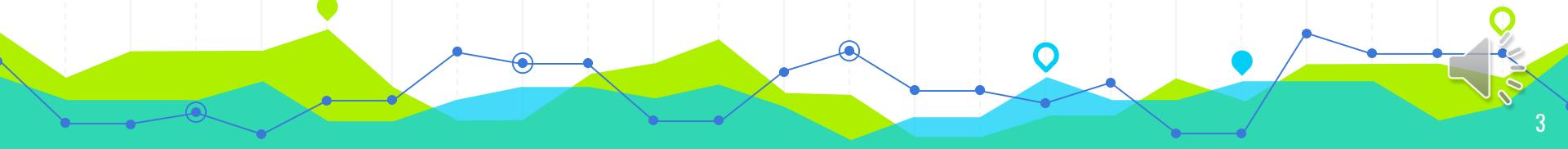
- Disposable nappies were invented around the 1950's. The first waterproof diaper cover was invented in 1946 by Marion Donovan.
- Another disposable diaper design was created by Valerie Hunter Gordon and patented in 1948.
- Ever since their introduction, product innovations include the use of **superabsorbent polymers, wetness indicator, resealable tapes, etc.**
- Modern disposable baby nappies have a layered construction, which allows the transfer and distribution of urine to an absorbent core structure where it is locked in.



Marion Donovan

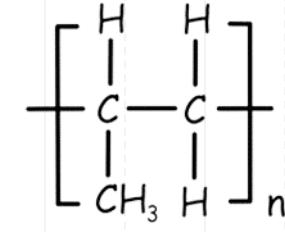
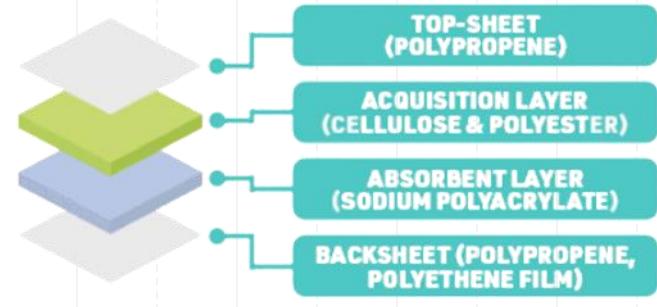


Valerie H. Gordon



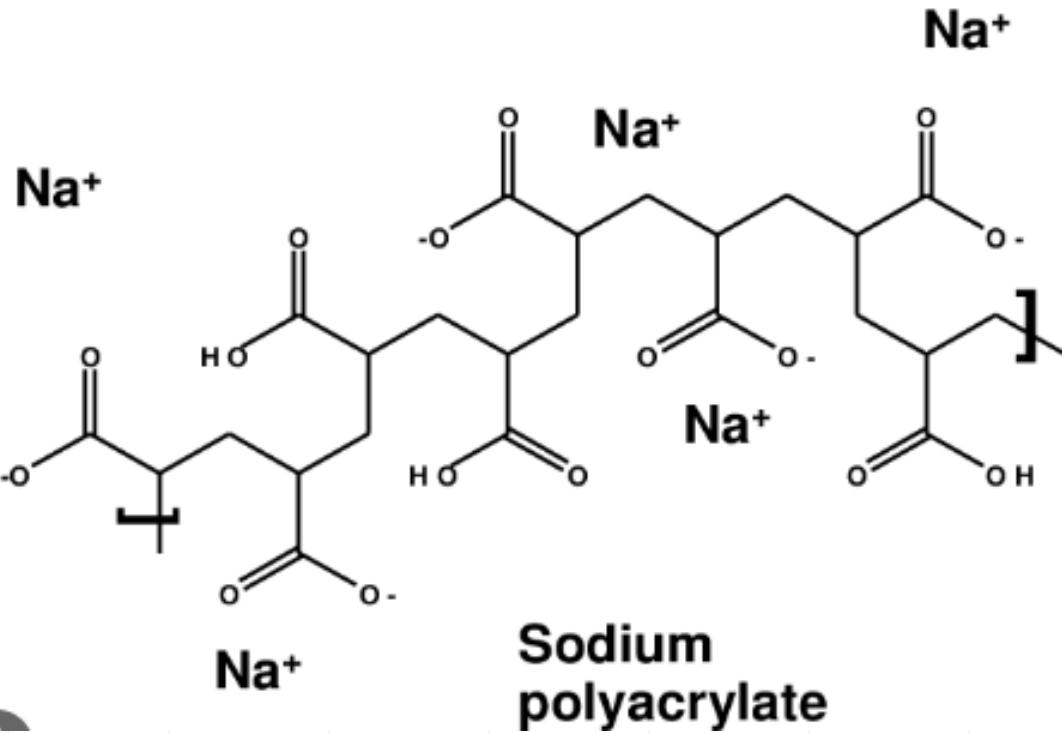
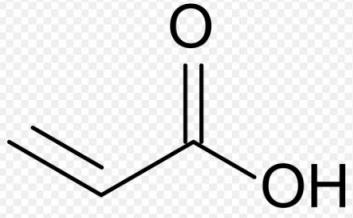
Layers of a Disposable Nappy

- **Top-sheet:** Commonly made of polypropylene, it is the closest layer to the baby's skin. It allows the baby's urine to pass through and into the layers below.
- **Acquisition layer:** Usually composed of cotton and polyester, this layer absorbs the urine, moving it away from the baby's skin.
- **Absorbent layer:** Contains some cotton too but also contains another polymer *Sodium Polyacrylate*. This is a superabsorbent polymer which is able to absorb a whopping 800 times its own weight in distilled water.
- **Backsheet:** Water-resistant layer commonly composed of polypropylene and polyethene. Prevents the wetness contained in the nappy from transferring to the baby's sheets or clothes.



Polypropylene
(PP)





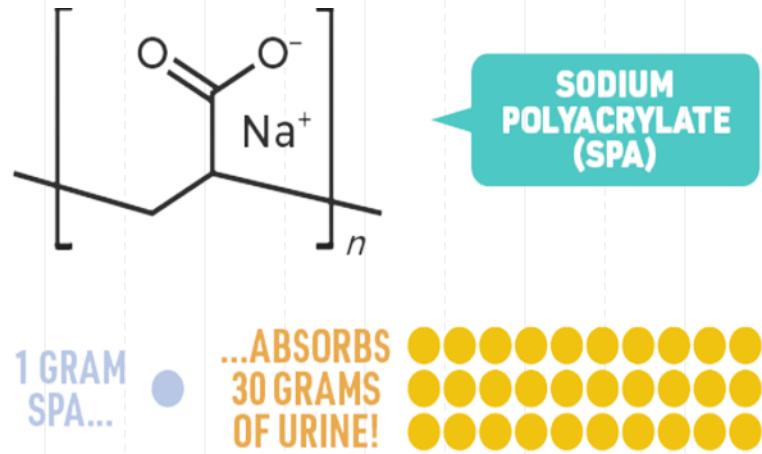
How Do Nappies Absorb Urine?

- The absorption takes place mainly in the **Acquisition layer** and the **Absorbent layer**.
- The acquisition layer contains cotton which absorbs up to 27 times its weight in water. It does a pretty good job of soaking it up even though the presence of salts and other compounds in urine reduce the amount that it absorbs relatively.
- In the absorbent layer the superabsorbent polymer, **Sodium Polyacrylate** forms a gel as it absorbs the urine preventing wetness inside the nappy. Like cotton, the presence of salts and other compounds reduces its absorbency as well.



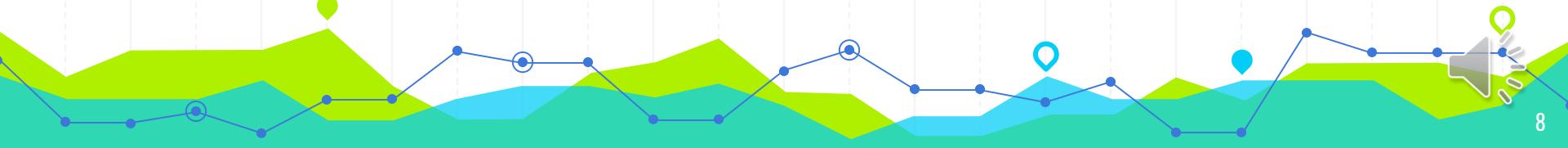
What is Sodium Polyacrylate (SPA)?

- Sodium Polyacrylate is a sodium salt of polyacrylic acid with the chemical formula $[-\text{CH}_2-\text{CH}(\text{CO}_2\text{Na})-]_n$ and is a Super-absorbent polymer (SAP).
- It absorbs **thirty times** its own weight in urine.
- It contains sodium, which gives it the ability to absorb large amounts of water.
- When dissolved in water, it forms a gel due to the ionic interactions of the molecules.



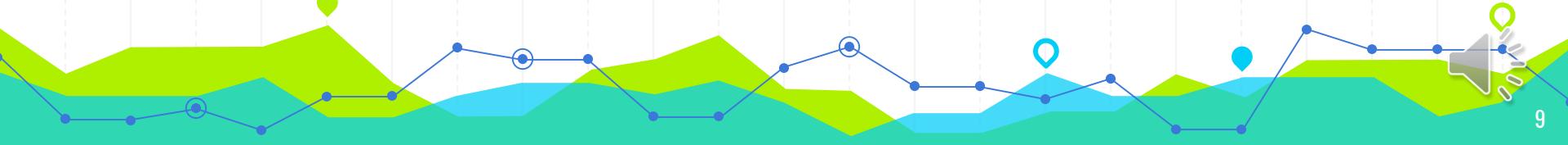
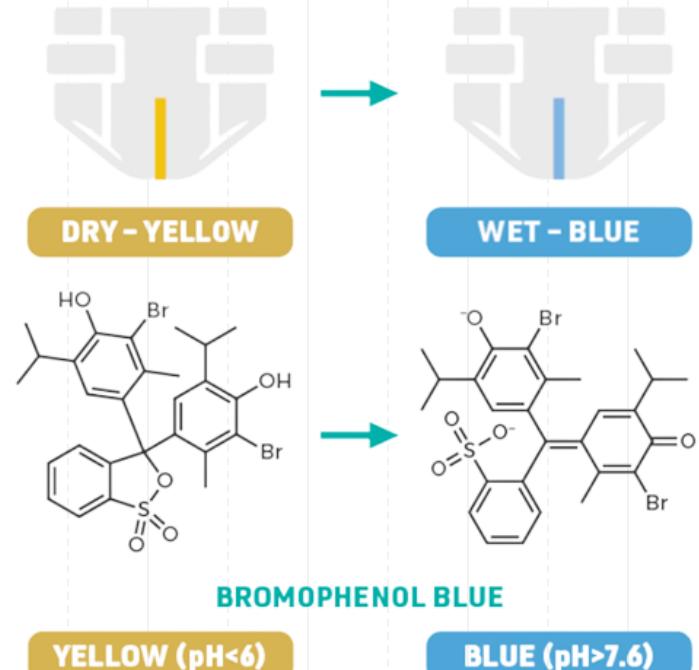
Absorbency: Huggies vs Pampers

- The Pampers diaper is composed of an average of 3.97 g of sodium polyacrylate, linked on a thin thread, and an average of 0.71 g of cotton.
- Huggies has an average of 1.88 g of fine powdery sodium polyacrylate and an average of 6.97 g of cotton.
- Since, sodium polyacrylate absorbs 30 times its own weight in urine and cotton absorbs 27 times its own weight.
- Thus Huggies with 10 times the amount of cotton in Pampers and Pampers with only 2 times the amount of sodium polyacrylate in Huggies, ***Huggies absorb more simulated urine.***



How Does Wetness Indicator Work?

- The outside surface of some nappies for younger babies have included a *wetness indicator*, commonly in the form of a coloured line changing color with wetness.
- Wetness indication could be achieved in many ways by using chemicals to detect moisture or acidity.
- One method involves usage of pH indicator Bromophenol blue, which is yellow when the nappy is dry and blue when filled with urine (*alkaline*).



Environmental Impact of Disposable Nappies

- Disposable nappies account for 2-3% of all household waste in the UK.
- It's estimated that a disposable nappy takes around 450 years to fully decompose in a landfill.
- As per another estimate over the time a typical child wears nappies, disposables would create 550kg of carbon emissions through their manufacture, distribution, and disposal.
- Thus given their environmental impact, alternatively reusable nappies could be considered.

HOW MANY NAPPIES PER CHILD?

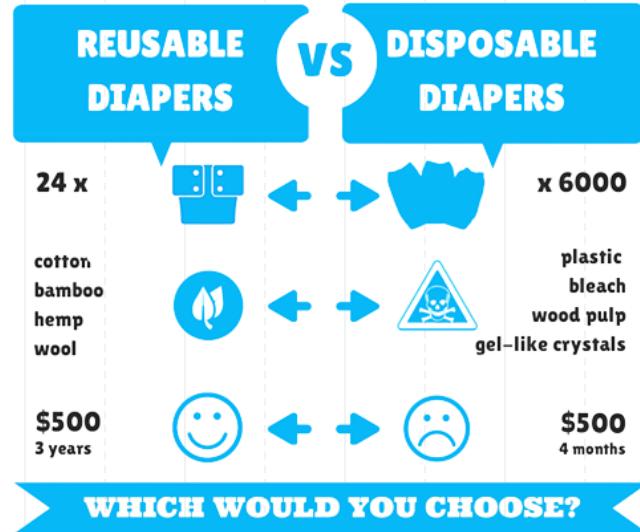


5,000 NAPPIES
(IN TOTAL, ON AVERAGE)



Disposable vs Reusable Nappies

- Taking into account the impacts of laundering reusable nappies, their carbon emissions impact was comparable to that of disposable nappies.
- As per a study, air drying instead of tumble-drying, reusing nappies with a second child, and several other factors could all bring down the impacts of reusables.
- Reusables don't generate the same volume of waste that disposable nappies do.
- Regardless of the debate of the benefits of reusables versus disposables, disposable nappies remain the more popular of the two.



CH -419 Consumer chemistry presentation

Presentation topic – Deodorants and antiperspirants

This is not as it seems ,let's find .



In Simple Words

Deodorants- Gets rid of odor, as the name implies.

Antiperspirant- Stops perspiration, as the name also implies.

Deodorants

- ▶ Deodorants combat body odor. Body odor isn't caused by sweat itself, which is mainly water; it's produced by the mix of bacteria that live on the skin, break down our sweat, and give off the scent we recognize as B.O.
- ▶ Deodorants use active ingredients like alcohol, sodium stearate, and sodium chloride to eliminate bacteria, antimicrobials to slow bacteria growth, and fragrances to improve smell. But don't expect to sweat less if you use a deodorant, as it won't reduce sweat production.

UC San Diego

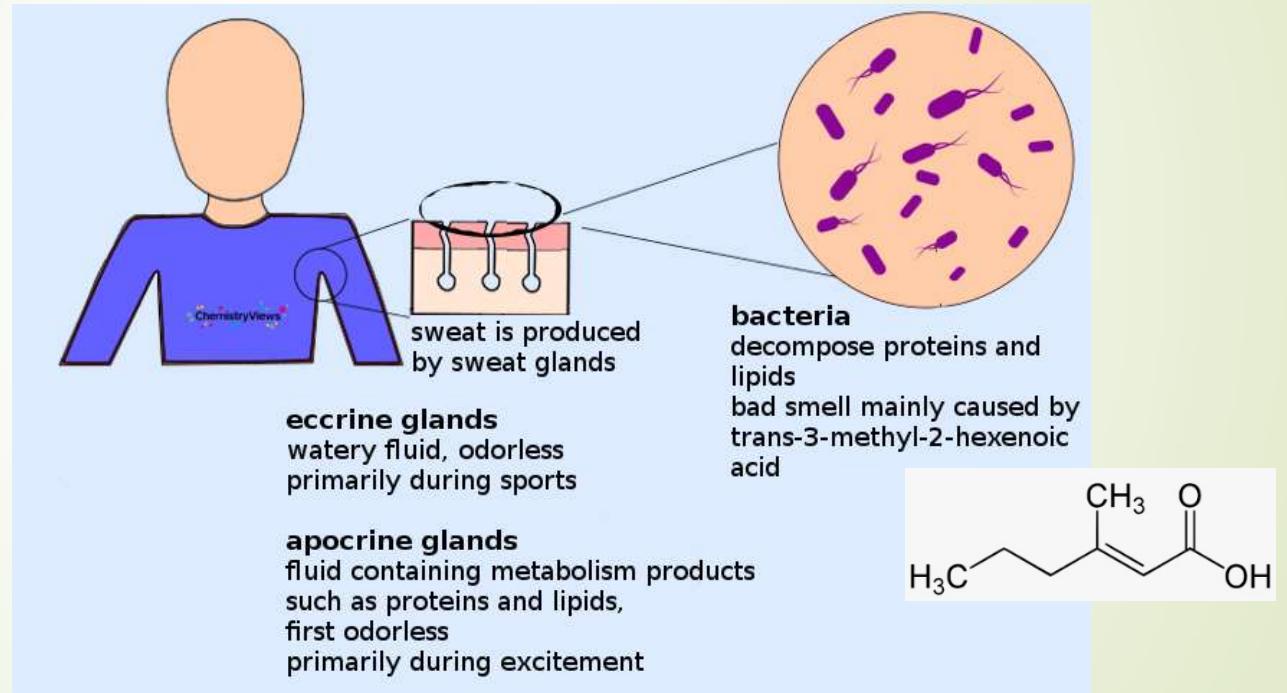
JACOBS SCHOOL OF ENGINEERING



The science of
sniffs: disease
smelling dogs



Where Does Body Odor Come From?



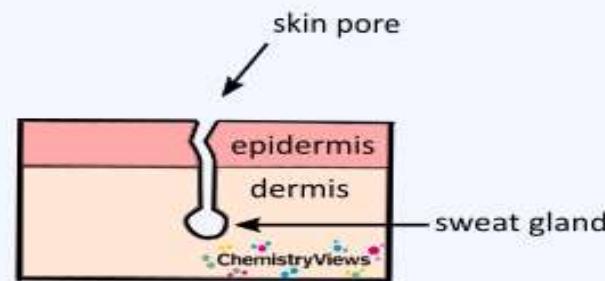
Antiperspirant

- ▶ Anti-perspirants are considered the first line of treatment for excessive sweating of the underarms, hands, feet, and sometimes face. Experts recommend that they be tried first, before other more invasive treatments.
- ▶ Antiperspirants are applied to the top of the skin. Once an antiperspirant is applied to the skin, perspiration in the underarm grabs and dissolves the antiperspirant particles, pulling them into the pores and forming superficial plugs that are just below the surface of the skin. When your body senses that the sweat duct is plugged, a feedback mechanism stops the flow. The plugs can stay in place for at least 24 hours and then are washed away over time.

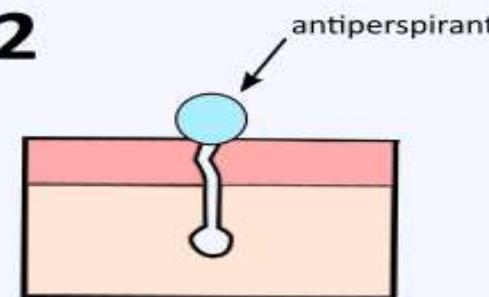
How Do Antiperspirants Work?

- Aluminum or zirconium compounds, such as **aluminum chlorohydrate**, react with water in the glands to form gel-like plugs of **aluminum hydroxide** that block the sweat glands:

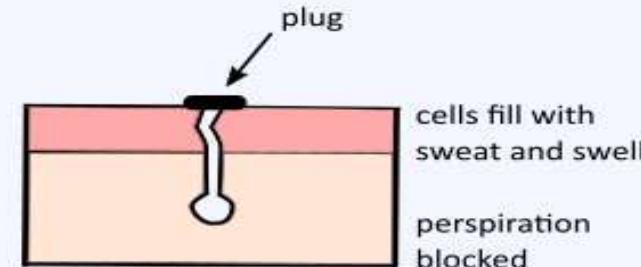
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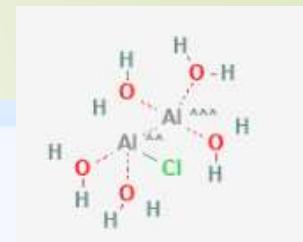
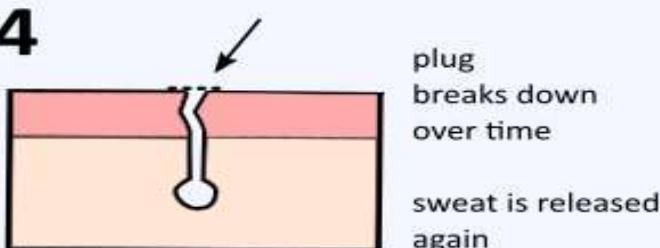
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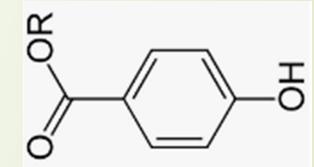


4



Health Effects

- ▶ Alcohols can dry out and irritate the skin
- ▶ Aluminum compounds are liked to cause breast cancer and Alzheimer's disease, but without conclusive evidence
- ▶ Parabens can cause allergies and be carcinogenics
- ▶ Some complex-compunds used cause accumulation in environment



Effects of over use of deodorants and Antiperspirants

- ▶ Over-using deodorants leads to inhaling chemicals from the aerosols that can cause allergic skin reactions, asthma and breathing difficulties
- ▶ For sensitive skin, adapt natural deodorants than chemical ones.

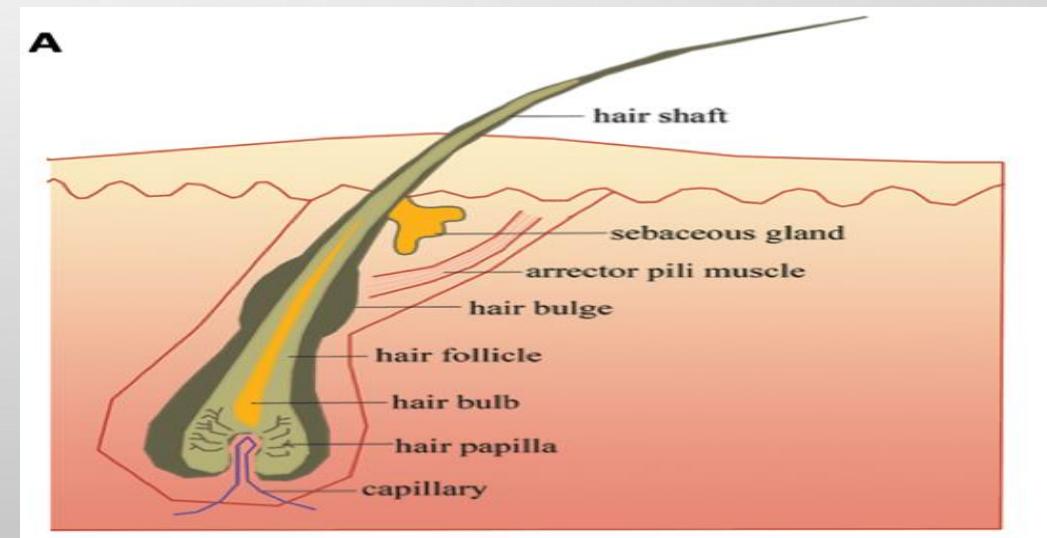
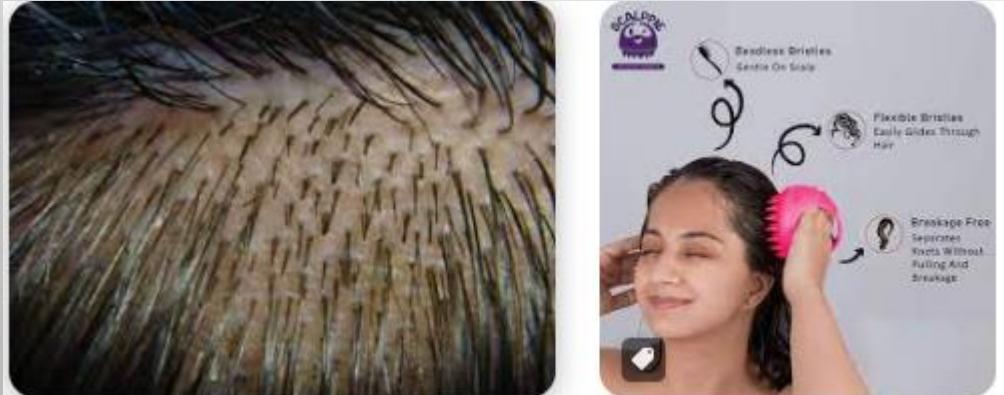


CH-419

CHEMISTRY OF HAIRCARE

INTRODUCTION:

The **scalp** is the skin that covers the top of the head and is the foundation for healthy hair growth. The scalp is rich in blood vessels that provide the hair follicles with nutrients, oxygen, and hormones necessary for growth. It also contains oil-producing glands that keep the scalp and hair moisturized. A healthy scalp is crucial for healthy hair growth, and a number of factors can affect the scalp, **including genetics, hormonal imbalances, stress, and poor diet**. Some scalp conditions, **such as dandruff, psoriasis, and seborrheic dermatitis**, can also occur and lead to hair loss or other hair problems.



Chemicals Produced by the Scalp:

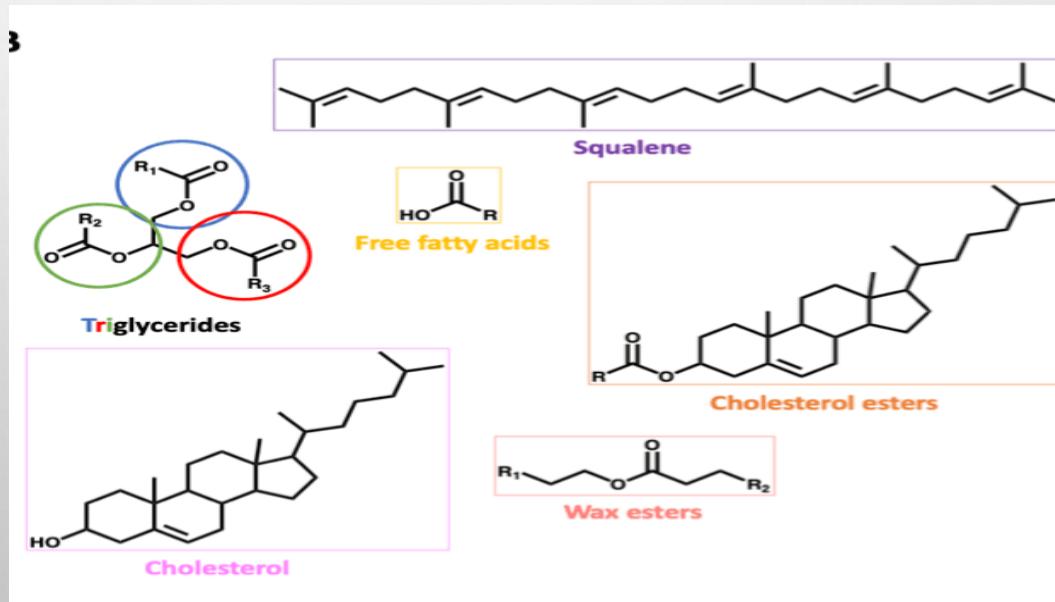
Sebum:

Sebum is an oil produced by the scalp's sebaceous glands. It is a key component in maintaining the health of hair and scalp.

It helps in:

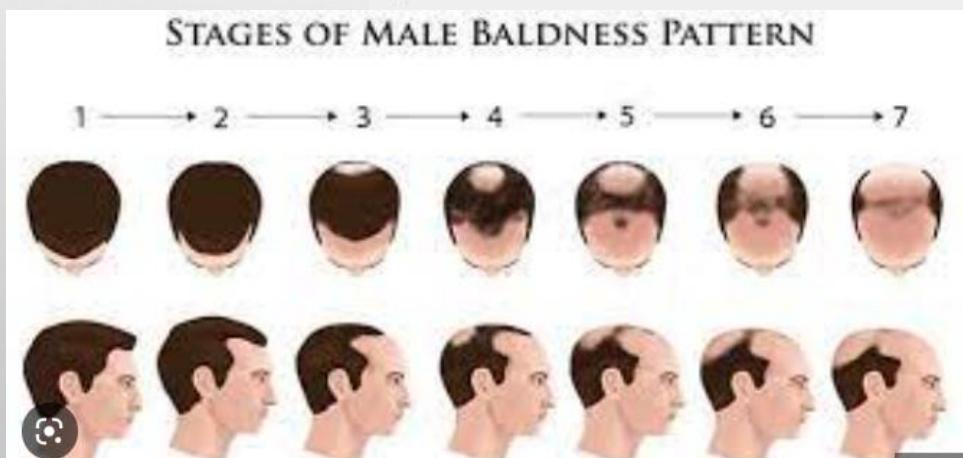
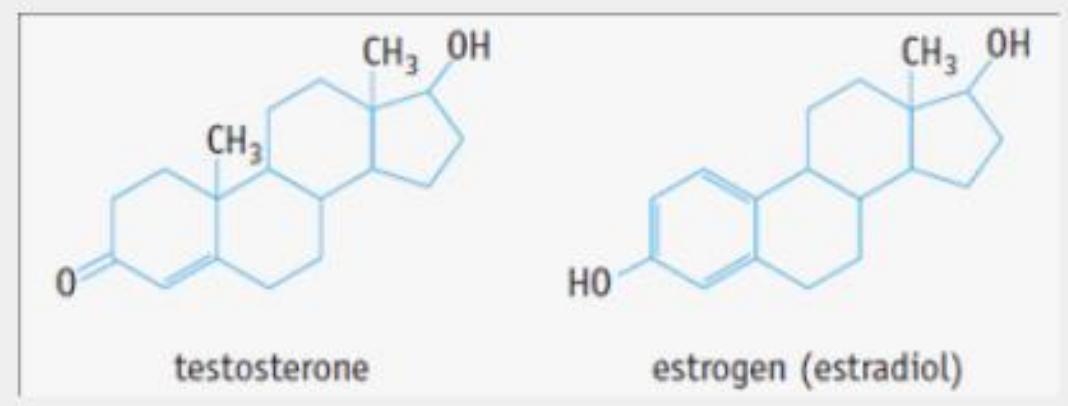
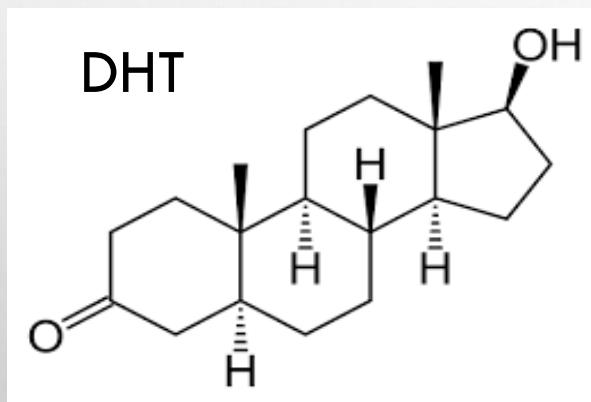
- Moisturization
- Protection
- Conditioning
- pH balance

However, too much sebum can be a problem, as it can lead to an **oily scalp** and clogged hair follicles, which can cause dandruff and other scalp conditions. On the other hand, a lack of sebum can lead to dry and brittle hair.



DHT(Dihydrotestosterone):

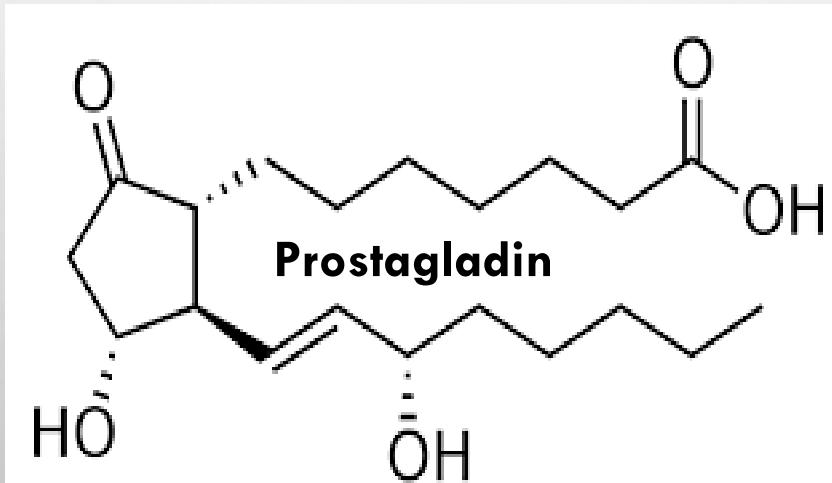
DHT (dihydrotestosterone) is a hormone that plays a role in hair health, particularly in the development of **androgenetic alopecia**, which is a common form of hair loss. DHT is derived from testosterone and is involved in the miniaturization of hair follicles, causing them to shrink and produce finer, shorter hairs over time. Eventually, the hair follicle may stop producing hair altogether. **This is why DHT is considered a leading cause of male pattern baldness.**



Prostagladins:

Prostaglandins are hormone-like compounds that play a role in regulating hair growth. Imbalanced levels of prostaglandins can contribute to hair loss.

- Shampoos can be formulated to address some of these hair and scalp problems. They are involved in regulating hair follicle cycling, meaning they can influence the duration of the anagen (growth) phase and the telogen (resting) phase of the hair cycle. Prostaglandins are involved in the regulation of blood flow to the scalp, which is essential for maintaining healthy hair follicles. In addition, they help regulate the production of sebum, an oil produced by the scalp that helps keep hair moisturized.

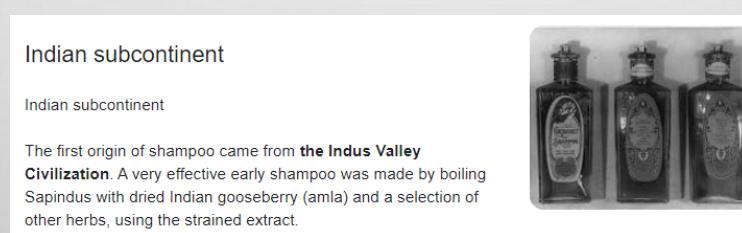


Importance of Shampooing:

- It is a cleaning agent that removes dirt, oil, and other impurities from your hair and scalp, leaving them fresh and clean.
- why shampooing is important for scalp health:
- Cleanses the Scalp:** Shampoo helps in removing dirt, oil, and other impurities from the scalp, which can clog the hair follicles and cause itching, flaking, and dandruff.
- Regulates Oil Production:** Overactive oil glands can lead to an oily scalp, which can attract dirt and lead to scalp infections. Shampooing helps in regulating the oil production on the scalp, keeping it clean and healthy .
- Prevents Infections:** A dirty scalp is more susceptible to infections and other scalp problems, such as dandruff, psoriasis, and seborrheic dermatitis. Regular shampooing can help in preventing these infections .
- Promotes Hair Growth:** A clean and healthy scalp is crucial for promoting hair growth. Shampooing helps in removing impurities that can clog the hair follicles, allowing the hair to grow freely.
- Adds Volume and Shine:** Shampooing helps in removing the build up of product and oil from the hair, adding volume and shine to your locks/looks.

Types of Shampoos:

- Anti-dandruff shampoos
- Anti-hairfall shampoos
- Moisturizing shampoos
- Volumizing shampoos
- Colour-protecting shampoos
- Sulphate-free shampoos
- Repairing shampoos



Common hair and scalp related problems:



Excess sebum building on scalp



Dandruff



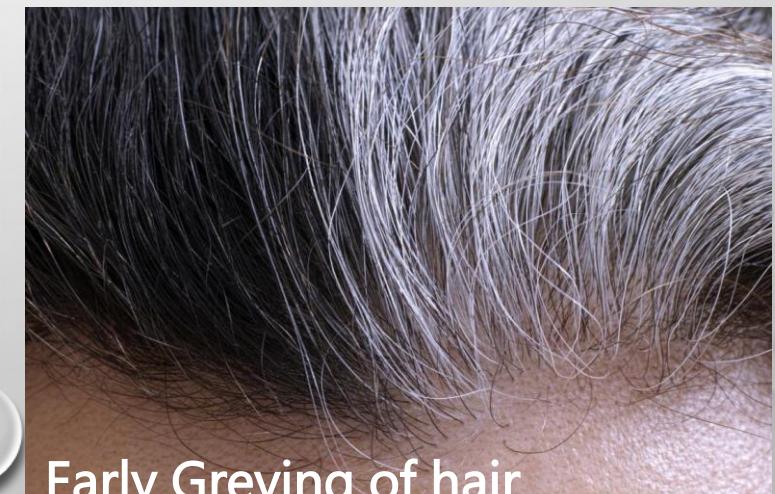
Hairfall



Dry scalp



Itchy scalp



Early Greying of hair

Excess Oil controlling Shampoo:

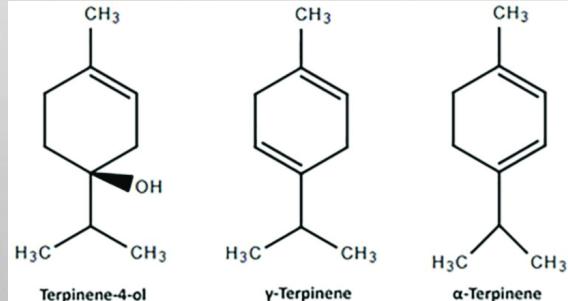
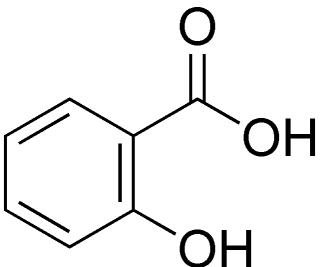
There are several ingredients in shampoos that can help to control excess oil production on the scalp.

Salicylic acid: This ingredient is a **keratolytic**, which means it helps to break down the build-up of dead skin cells on the scalp. It can also help to regulate sebum production, making it a useful ingredient for controlling oily hair.

Tea tree oil: This essential oil has antifungal and antiseptic properties, which can help to control dandruff and other scalp conditions that can contribute to excess oil production.

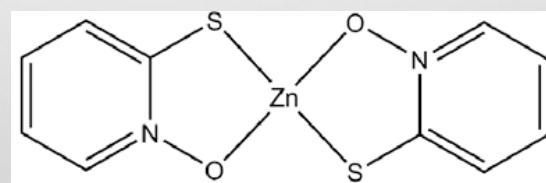
Zinc pyrithione: This is an antimicrobial ingredient that can help control the overgrowth of yeast and bacteria on the scalp, which can contribute to excess oil production.

Sulphur : This mineral has antiseptic properties and can help to regulate oil production on the scalp.

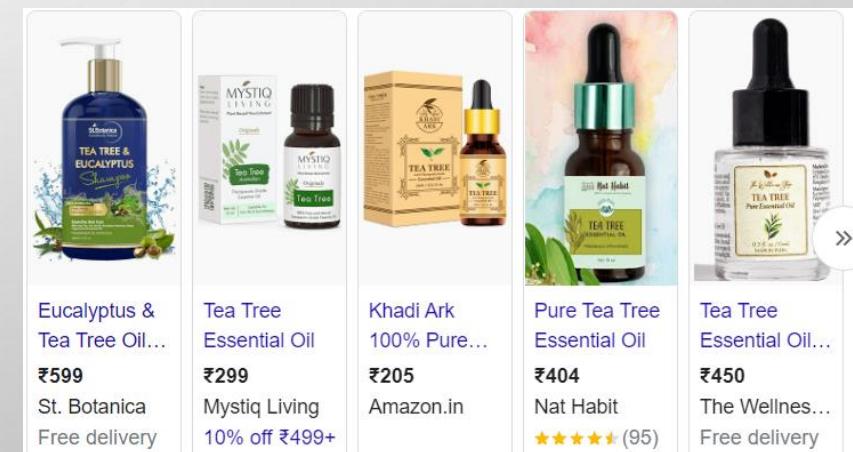


Salicylic acid

Major components of Tea Tree Oil



Zinc Pyrithione



Anti-Hairfall Shampoos:

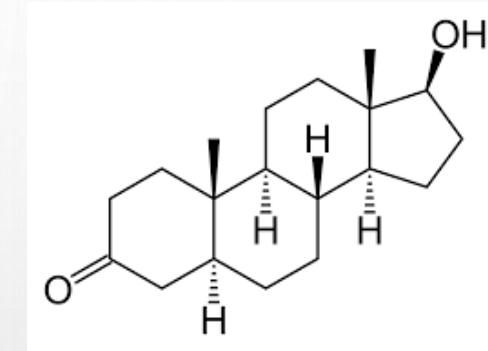
There are several ingredients commonly found in shampoos that are marketed for reducing hair loss and promoting hair growth. Some of these ingredients include:

Biotin: This B-vitamin is essential for healthy hair growth, and shampoos that contain biotin may help to strengthen hair and reduce breakage.

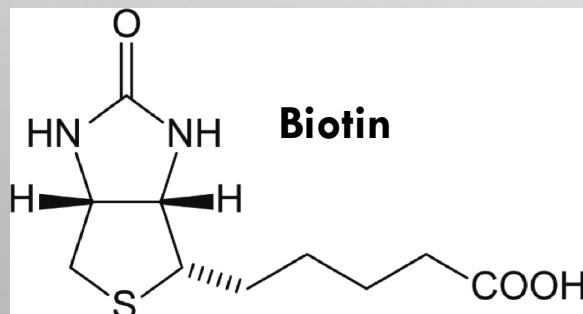
Niacin: Also known as vitamin B3, niacin is essential for healthy circulation, which is important for maintaining healthy hair growth. Some shampoos contain niacin to help improve circulation to the scalp and promote hair growth.

Saw palmetto: This is a natural ingredient that is thought to block the production of the hormone DHT, which can cause hair loss.

Minoxidil: This is a topical medication that is FDA-approved for the treatment of hair loss. It is available in over-the-counter shampoos and other hair care products.



DHT



Biotin

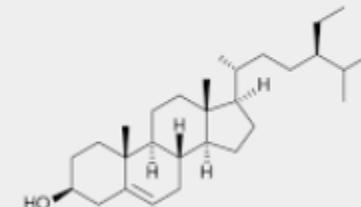


Minoxidil



niacin

SAW PALMETTO

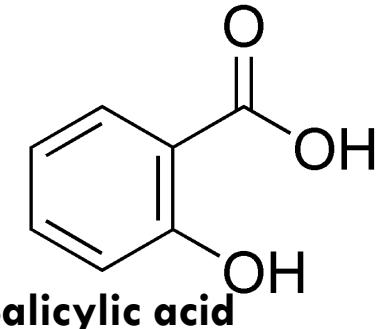


Anti-Dandruff Shampoo:

Some common active ingredients in anti-dandruff shampoos include:

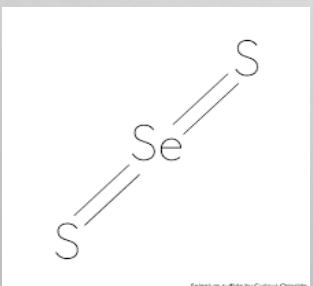
Zinc pyrithione: This is an antimicrobial ingredient that can help to control the overgrowth of yeast and bacteria on the scalp, which can contribute to dandruff.

Salicylic acid: This ingredient is a keratolytic, which means it helps to break down the build up of dead skin cells on the scalp. It can also help to regulate sebum production, which can be a contributing factor in dandruff.

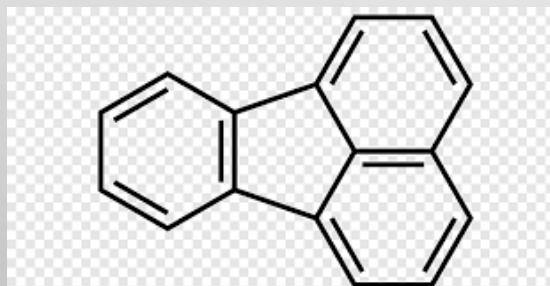


Selenium sulphide: This ingredient is an antifungal that can help to control the overgrowth of yeast on the scalp, which can cause dandruff.

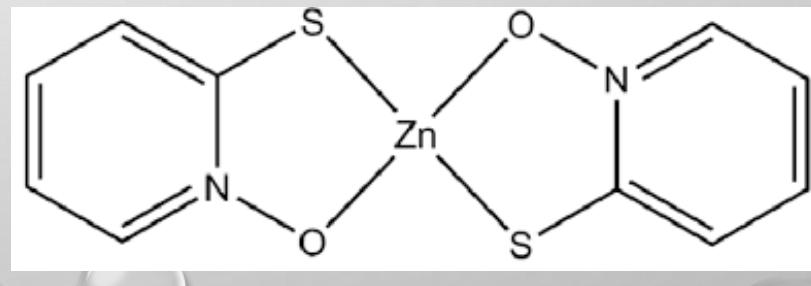
Coal tar: This ingredient is derived from coal and has antifungal and anti-inflammatory properties. It can help to reduce scaling and itching associated with dandruff. **?????**



Selenium Sulphide



Coal Tar

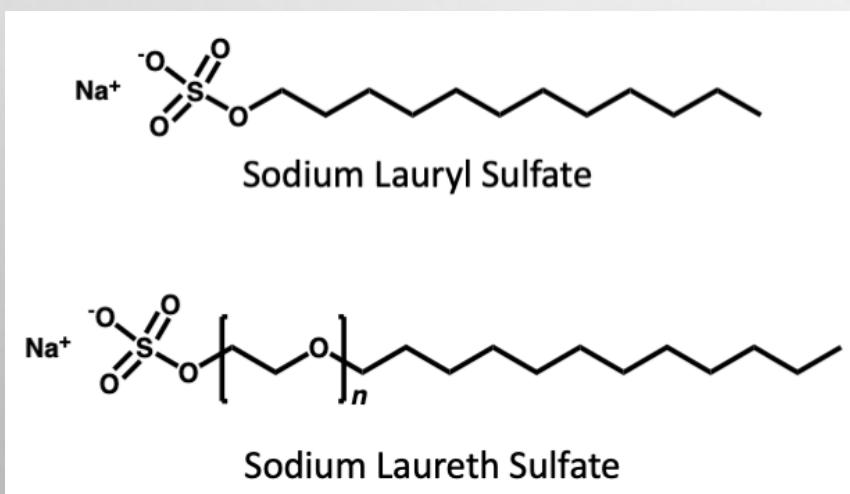


Zinc pyrithione

Working of Shampoos:

We use shampoo to remove the excess sebum from our scalps as water alone cannot. The composition of sebum, is predominantly made up of oily, fatty molecules which cannot dissolve in water

The primary surfactants present in most shampoos used to be **lauryl sulfates** compounds chosen for their ability to clean as well as foaming capabilities. Whilst many shampoos still contain lauryl sulfates, more recently **laureth sulfates** have been preferred by manufacturers as they show a decrease in irritation when in contact with the eyes. Shampoos are designed to not only clean the hair but to also leave behind a pleasant, fresh smell to the hair once washed off.



Hair Conditioners:

Shampooing the hair will inevitably remove not only excess oil but also important moisture from the hair and can leave it feeling dry.

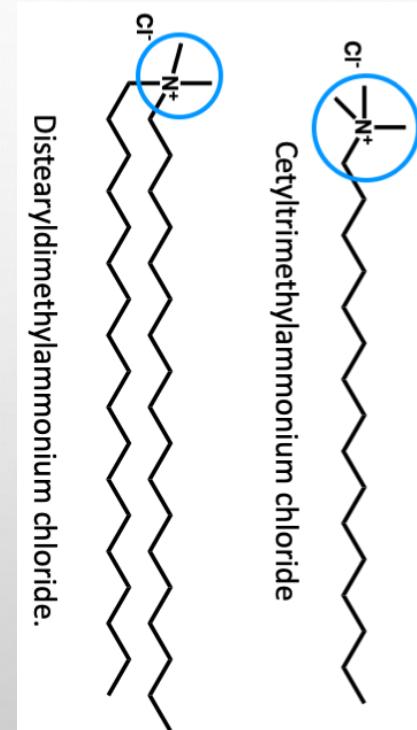
Conditioners are often used after the hair has been shampooed to lower friction between hair fibres which makes brushing the hair easier, as well as adding moisture back into the hair.

Conditioners contain cationic surfactants, molecules that possess a positive charge.

Strands of hair are negatively charged due to the deprotonation of amino acids that make up outer layer of the hair, and so when you put conditioner on your hair, the cationic surfactant molecules will preferentially deposit on the surface of the hair.

Once the positively charged surfactant molecules bind to the negatively charged hair, the overall coupling results in neutralization and therefore reduces the overall charge of a person's hair, reducing static.

Conditioners also contain polymers which help to detangle hair, as well as silicones which are heat resistant and work to lubricate hair strands, adding gloss and shine.

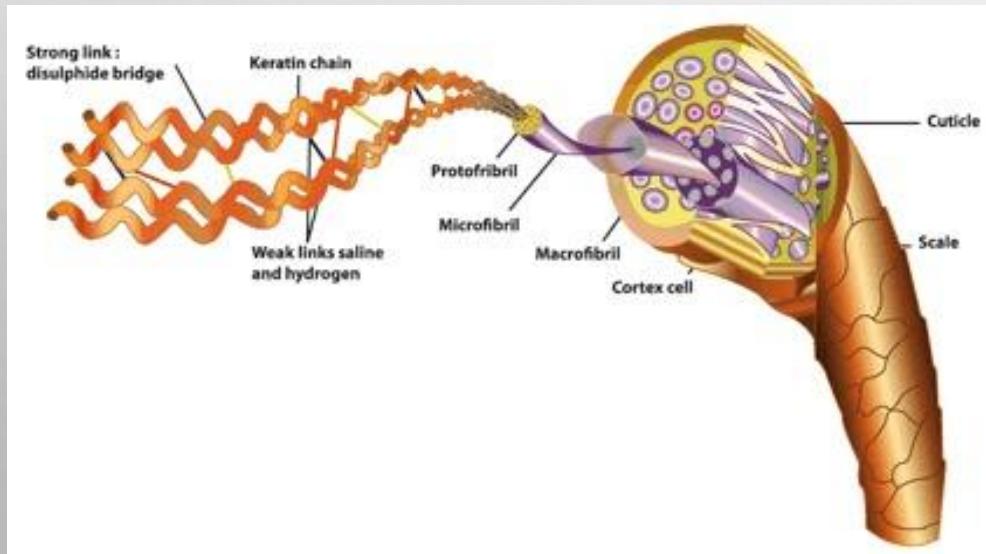


KERATIN TREATMENT:

Keratin treatments are hair care products that contain a form of keratin protein that is designed to repair and protect the hair. The chemistry behind keratin treatments involves the application of the keratin protein to the hair shaft.

The keratin protein used in these treatments is typically a hydrolyzed form of the protein, meaning it has been broken down into smaller, more easily absorbed molecules. When the keratin treatment is applied to the hair, these small keratin molecules penetrate the hair shaft and bond with the existing keratin in the hair.

The bonding process is facilitated by the use of heat, typically from a flat iron or hair dryer, which helps to activate the keratin and secure it to the hair. As the heat is applied, the keratin molecules begin to form cross-links with one another and with the existing keratin in the hair, creating a network of interconnected proteins that helps to reinforce and strengthen the hair.





FORGOTTEN GIANT OF INDIAN SCIENCE



G.N. Ramachandran

(8 Oct, 1922 - 7 Apr, 2001)

Most remembered for discovering
the structure of the protein collagen and
for conceptualizing **the Ramachandran map**.

The Ramachandran Plot

In the diagram the white areas correspond to conformations where atoms in the polypeptide come closer than the sum of their van der Waals radii

These regions are sterically disallowed for all amino acids except glycine which is unique in that it lacks a side chain

