asslamo alaikum sir .. im actually facing an issue in making notces of GSA

kindly please guide me how to make notce..

these notces that ive made it took me like 2 weeks to complete it. it shoud be lenghty or short at intial level?

or should i make it in word ? thank you

Type your text

Biological Science

Nutrients

nutrients are the
constituents of food which perform
important functions in our body. If
these nutrients are not present in
our body in sufficient amount the
result is ill health

Important nutrients includ:-

↳ Carbohydrates
↳ Lipids
↳ Vitamins
↳ Minerals
↳ water

I have checked these. The issue is that they are a bit lengthy. Shorten them a bit.

And about the word part. Yes if you are comfortable reading in soft then go for them. They save a lot of time

A nutrient is a substance used by
an organisms To survive, grow and
reproduce.

Unbalanced diet

A diet that is not balanced. That contain more carbohydrates, fat and less proteins.

↳ Artificially sweetened food
↳ increase intake of salt
↳ Minimal intake of fruits, vegetables
↳ fish and whole grains

An unbalanced diet can either lead to Malnutrition.

Malnutrition:-

The deficiency of proper nutrients in our body is called malnutrition. Unbalanced diet leads to an malnutrition.

Causes of Food deficiency:

- wars
- Famines
- internal displacement
- poverty
- Neglect
- Ignorance

inability to metabolize and absorb nutrients

In Pakistan:

most common nutrition deficiencies are iron, calcium, zinc and vitamin A and D.

Cause:

- ↳ lack of nutritional awareness
- ↳ high population growth
- ↳ Low purchasing power
- ↳ Price fluctuation
- ↳ Erratic food production
- ↳ Inefficient marketing system.
- ↳ Low healthcare and hygiene
- ↳ Inflation

How to plan a balanced diet:-

Diet depends on person to person. For Example; A young boy of 15 required more calories or energy than an adult man who does not do heavy work. Similarly lactating women require high energy and high protein diet for good lactation.

Food must be selected from all
(5) groups
Economic status of person be kept
in mind Food which is cheap
makes balanced food and is
locally available should be used.

Difference between Marasmus and Kwashiorkor:

	Marasmus	Kwashiorkor
Cause	deficiency of both proteins and calories	
Age	Between the age of 6 months and 1 year of age	
Edema		Absent
weight loss	There is severe weight loss	
Symptoms	There is only thining of limbs	

Kwashiorkar:

Deficiency: Deficiency of protein

Age: Between the age of 6 months and (3) years

Edema: Present

weight loss: There is some degree of weight loss

Symptoms: There is thining of muscles and limbs

Enzymes

biological polymers that catalyze biochemical reactions

Structure of enzymes:

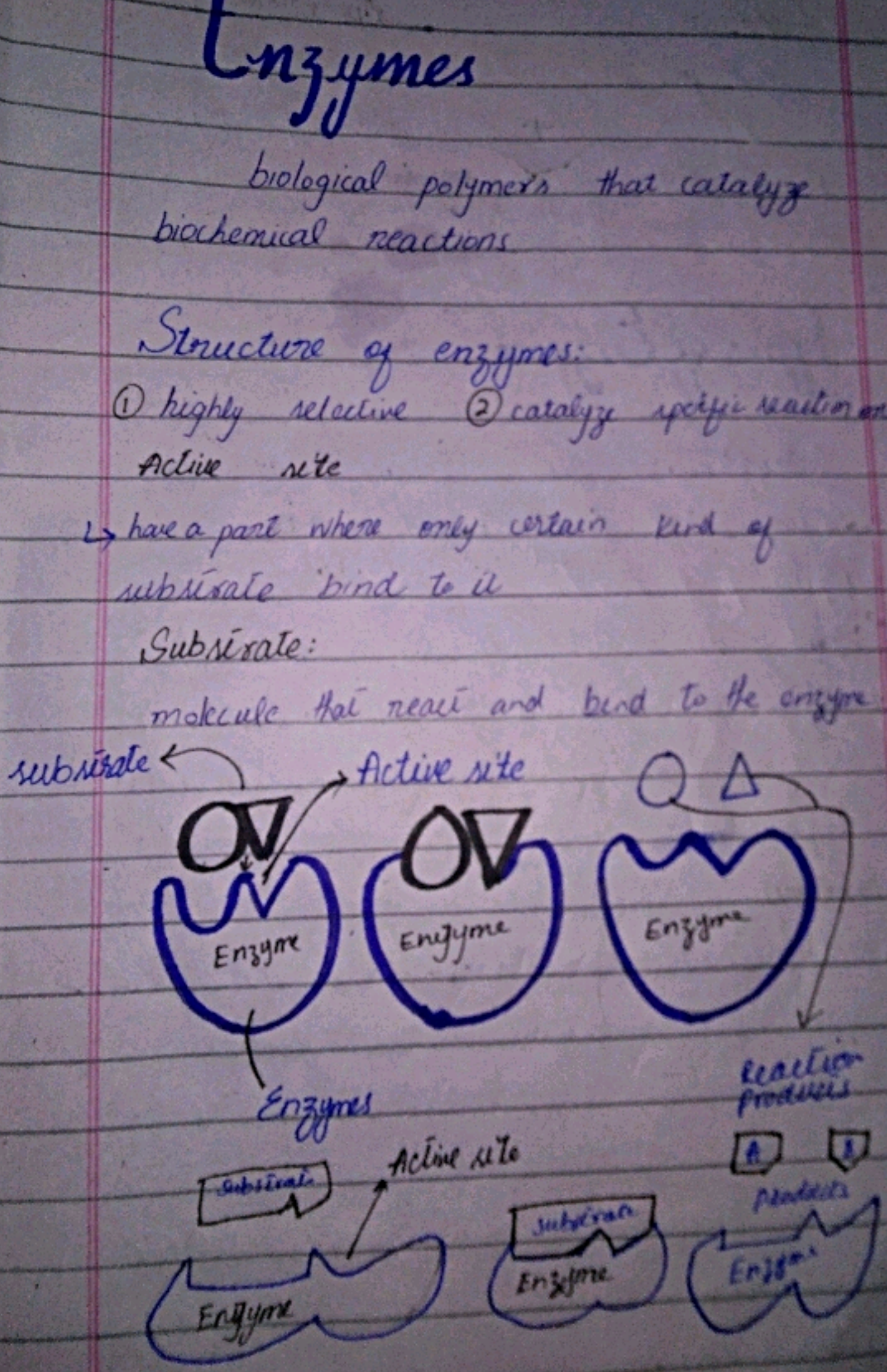
① highly selective ② catalyze specific reaction only

Active site

↳ have a part where only certain kind of substrate bind to it

Substrate:

molecule that react and bind to the enzyme



Isomerases:

Cells geometric and structural changes in a substrate molecule

* Glucose to Fructose
* Galactose to Glucose

Ligases

Catalyze the association of two molecules

EX DNA ligase catalyzes the joining of two fragments of DNA by forming a phosphodiester bond.

Properties and characteristics

They are always protein: Protein in nature that's the reason protein is essential for health

Specific in their action: substrate specific

Control one particular reaction ↳ pepsin only act on proteins

They can be used over again

there structure is not altered by the reaction

Destroyed by heat. Sensitive to temperature

Protein → denatured by heat, most of → stop working if the T rise 45°C. microbes have enzymes that can work on high temperature.

They are sensitive to Ph

Most intracellular work best in neutral condition

↳ Enzymes in stomach work best in acidic conditions ↳ small intestine work best in alkaline conditions.

Basic function:

increase the rate of a reaction

↳ million times faster than would be in absence

Regulate from a stage of low activity to high activity

Lock and key

Site specific like a key and lock

It is called lock and key model

↳ would only attach on a specific site

Functions of enzymes:

Signal transduction and cell regulation

Kinase and phosphatases help in this function

take part in bodily movement / help of protein myosin which aid in muscle contraction

Breakdown of large molecules into absorable

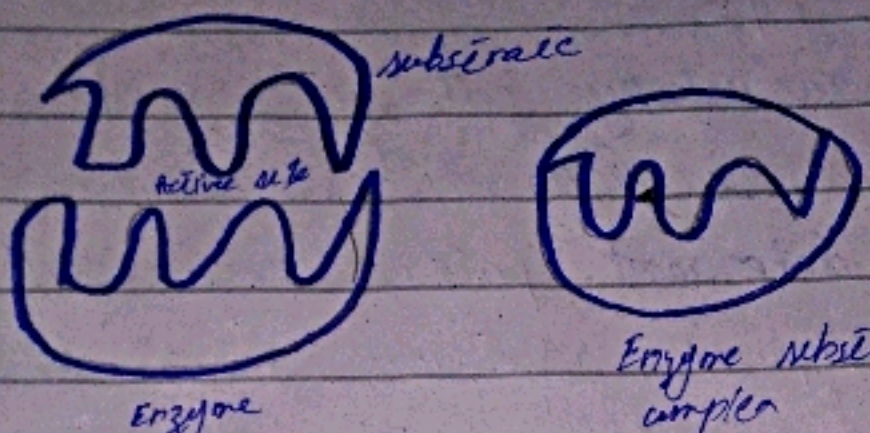
Work together in an order forming metabolic pathways.

glycolysis.

Lock and Key model

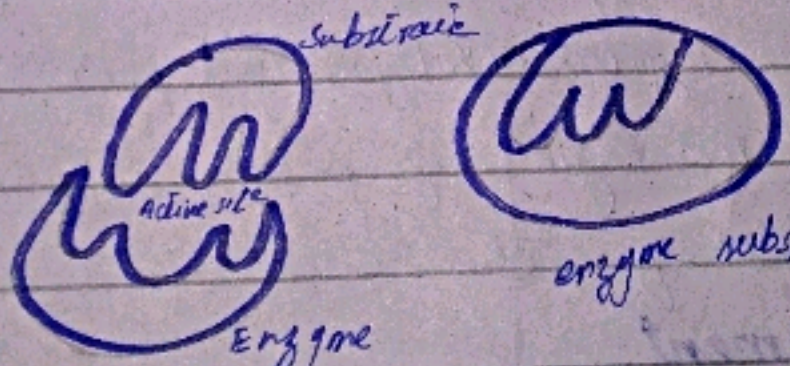
1894 Emil Fisher

enzyme and substrate posses complementary geometric shape → that fit exactly into one another.



Induced Fit model:

1958 Daniel Koshland



modification of lock and key model

enzymes are rather flexible structure

active site continuously reshaped by interaction with the substrate / as the substrate interact with the enzyme

Application of Enzymes

- **Industry**
  - **Leather tanning**
    - ① Amylolytic, proteolytic
    - ② lipolytic
  - **Starch processing**
    - ① Amylase, glycomylases
    - ② Amyloglucosidases
  - **Detergents**
    - ① Proteases, Amylases
    - ② Lipases, cellulases
  - **Textile**
    - Amylases
    - catalase / laccase
  - **chemical pharma**
    - Laclase, Papain
    - Pepsin, Bromelain
  - **Food processing**
    - Protease, Amylase
    - Lipases, cellulases
  - **Protein hydroly**
    - single: trypsin
    - multiple: mixture of Proteases = pronase, pepsin
  - **Bio-fuel**
    - cellulase
- **Environment**
  - **Degradation of residual Waste**
    - (hydrolases and Lipases)
  - **Detoxification of toxic sub**
- **Agriculture**
  - **Animal feed additive**
    - glucanase
  - **Feed processing**
  - **Agroprocessing**

Vitamins

Define:

A vitamin is an organic molecule, an essential micronutrient that an organisms needs in small quantities for the proper functioning of its metabolism.

↳ These cannot be synthesized by the body in adequate amounts.

↳ The body's requirement for vitamins may vary considerably. depending upon age, sex, physical activity, diet, metabolic rate state of health drug therapy individual, habits and other factors affecting vitamin absorption, utilization and excretion.

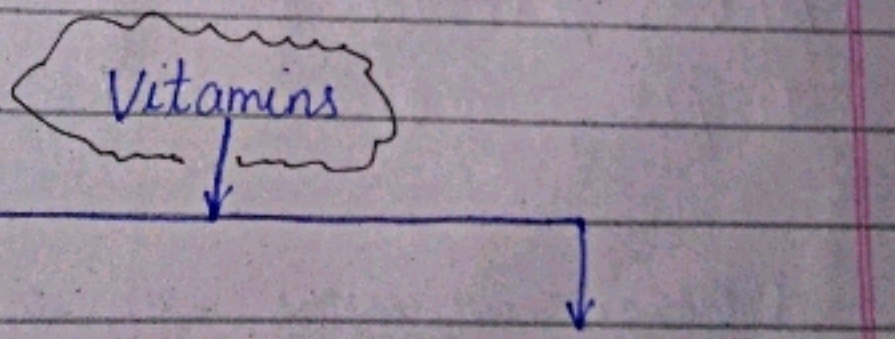
Vitamins deficiency can or vitamins absence can lead to dyficiency diseases.

Classificaton of Vitamins:-

Vitamins can be classified according on the bases of water or fat.

soluble

Fat soluble	Water soluble
↳ dissolve easily in the water and in general, are readily excreted from the body	↳ Fat soluble vitamins are stored in the fats in human body.
↳ They are excreted easily, they have to be replenished on regular almost daily basis.	↳ They are stored in fats, therefore, they are not readily excreted from body and are not taken in a controlled fashion.
They do not cause toxicity	They do cause Toxicity



Fat s

Water soluble

↳ vitamin B_1
Thiamine

↳ Vitamin B_2
Riboflavin

↳ Vitamin B_3
Niacin

↳ Vitamin B_5
Pentothenic acid

↳ Vitamin B_6
Pyridoxine

↳ Vitamin B_7
Biotin

↳ Vitamin B_9
Folate or Folic acid

↳ Vitamin B_{12}
Cyanocobalamine

↳ Vitamin C
Ascorbic Acid

Fat soluble

↳ vitamin A
Retinol

↳ vitamin D (D_1 and D_2)

↳ Vitamin E
Tocopherol

↳ vitamin K
Manadion

ADEK

Trick to remember:

Tania Rania never play poor basket ball for country.

Different types of Vitamins:-

Vitamins	Scientific name	Source	Function	Deficiency
↳ vitamin A	Retinol	Carrot, green vegetables	healthy vission Boost immune system	Xeroptholmus night blindness
↳ Vitamin B	B-Complex	Animal and dairy product	DNA Replication produce RBCs	muscle and body weakness
↳ Vitamin C	Ascorbic Acid	citrus fruits Berries and Tomato	Antioxidant, Formation of skin	Scurvy Anemia
↳ vitamin D	Calciferol	Fish, egg-yolk and cheese	Bone growth	Rickets Osteoporosis
↳ vitamin E	Tocopherol	Almond, peanut and soyabeans	Antioxidant Boost immune system	Neuropath Anemia
↳ vitamin K	Phylloquinone	Green leafy vegetables	Blood Coagulation	Hemorrhagic disease.

Lipids:

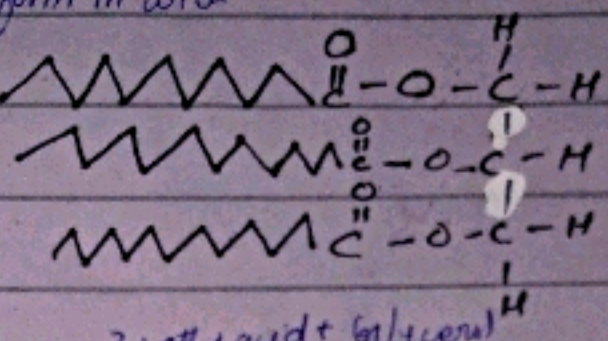
naturally → organic compounds → fat & oil lipids

Contribute to cell structure + take part in biological process

Provides 9.1 calories energy per gram.

Basic Unit: Triglyceride: synthesized from Glycerol (propane-1,2,3 Triol) + fatty acid

① Triglyceride: chemical form in wich most fat exist in the body



3 fatty acid + Glycerol

② Phospholipids:

found in membrane of animal + plants.

Contains: ① Glycerol + ② fatty acid + ③ phosphoric acid + ④ low molecular weight Alcohol

Lecithins

Comm → cephalins

Types:

saturated
↳ solid fat
Present mostly → Animal food (cheese + milk + meat)
↳ Also in Tropical oils = Coconut + palm + cocoa butter
healthy diet has 10%
* can raise Cholesterol

Trans fat
↳ This fat has been changed by process of hydrogenation → This process increase shelf life of fat, make it harder at room temperature
* Raise cholesterol present in processed food + snacks food + cookies

Unsaturated fats
↳ Liquid at room temperature
↳ Oils from plant
* improve cholesterol level in the body

Types:
unsaturated
1 Monosaturated fat
Polysaturated fat

Monounsaturated fat
① Avocado, ② nuts, ③ vegetables oil olive + peanut lower "bad LDL Cholesterol may also keep "good HDL" high

polyunsaturated fat
vegetable oil such as ① safflower, ② sunflower + ③ soybeans corn oil, main fat present in seafood. Lower LDL
Omega-3, omega-6 fatty acids.

Food Additives:

Preservatives

↳ prevent or slows down the growth of bacteriaes fungi so that food can be kept longer.

Sugar, Salt, citric acid
sodium nitrite & benzoate

Flavouring Agents

Add taste or fragrant smells to make food more edible

Spices, nuts / oils, herbs
natural

Stabilizers

↳ Mixes two liquids that usually do not mix together

↳ prevent the sendiments process in liquids

↳ provide a smoth & uniform structure.

provide Texture

For EX

pectin and lecithin

Carrageenan

Antioxidants

↳ Slows down the oxidation of fats in food.

↳ prevents oil or fatty food from becoming rancid. Vit A, C, E, Lutein

Coloaring Agents

Colours food to make it look more attractive

Paprika, turmeric, saffron

Caramel colouring

Thickening Agents.

↳ Thickening liquids such as soup and sauces

Animal derived

Gelatin

Fermentation

Produced = Xanthan

Plant fragments = pectin

In European Union:

all foods additives are identified by an E number while E stands Europe

Products labels must identify both the function of the additive in the finished food (colour preservatives) and the specific substances used either by reffering to the appropriate E number or its name

E 101 vitamin B2 (Riboflavin)

Types on other basis:

↳ **Direct food additives** are usually added during during processing of the food. To add nutrients keep the product fresh ans to make the food appealing They maybe man-made or natural

↳ Herbes slices to increase in the flavour in the food

↳ Vinegar for pickling foods ↳ Salt to preserve meat

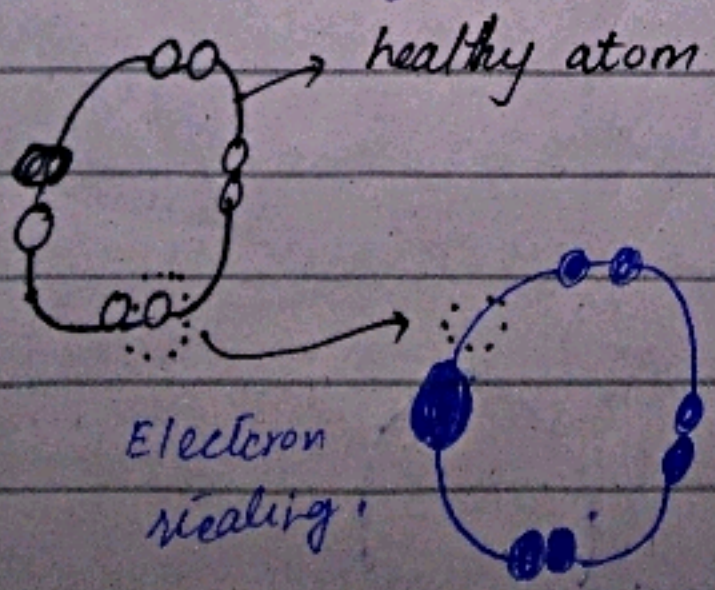
↳ **Indirect food additives** that may be found in the food during after the food is processed. They were not used or **placed** on purpose There become the part of food in trace amounts due to its packing, storage or other handling

Quality of Food

Antioxidants:

A chain reaction that occurs in the presence of oxygen is responsible for the deterioration in the quality of food products including off-flavours and off-odors.

The cells in human body contain both positive and negative charges. The cell is neutral its charges are equally paired when they exposed to Or they break down through a process called oxidation. When a substance oxidised if it gains Oxygen loses hydrogen or lose electron charged particle is now left without pairs. They are free, known as free radicals



Problem arises.

when these free radicals try to achieve their old state of stability by converting other stable cells to free radicals. This kicks off a chain reaction that has the power to cause oxidative stress. Oxidative stress has been linked to critical diseases.

Conditions caused by free radicals:

↳ Deterioration of the eye lens which contribute to blindness.

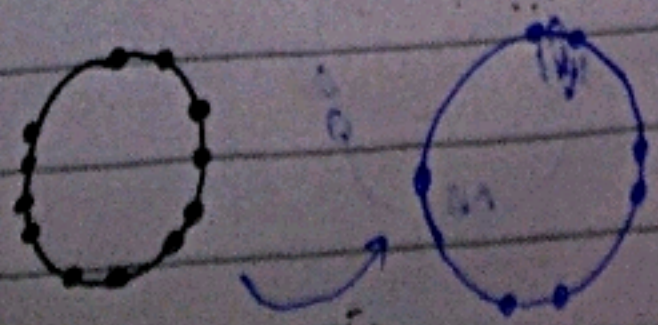
↳ Inflamation of the joint (arthritis)

↳ Damage to the nerve cells in the brain which contribute to condition such as Parkinsons or Alzheimers disease.

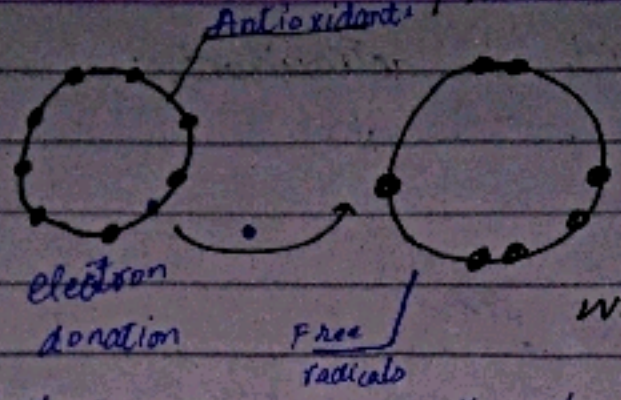
↳ Acceleration of the ageing process

↳ Increase risk of heart disease, since free radicals encourage low density lipoprotein (LDL) cholesterol to stick to artery walls.

↳ Certain cancers, triggered by damaged cell DNA



How do Antioxidant work: / Mecanism



Why are used:

① Antioxidants are one of the chief defence mecanism used by the body to prevent free radical formation.

② They prevent and/or slowdown the damage by donating electron to these free radicals, in effect neutalizing the harmful chain reactions that free radicals can set off

③ These substances are used to prevent oxidation of fats by molecular oxygen

④ Without Antioxidants potato chips, breakfast cereals salted nuts, fat containing dehydrated foods, crackers and many other fats-containing food (containing food) could not be stored very long without developing rancidity.

Synthetic Antioxidants:

↳ butylated hydroxy Anisole BHA

↳ Butylated hydroxy Toluene) butylated hydroxy toluene BHT

↳ Butylated hydroxy anisole BHA ↳ (Propyl gallate PG

↳ Tertiary Butylated hydroquinone TBQH

Natural

Foods rich in antioxidants:

↳ Grapes - Anthocyanins
↳ Blueberries
↳ Red berries
↳ nuts & milk = Copper = manganese
↳ Dark green vegetables green leaf vegetables = Spinach & corn
↳ Tea Flavonoids - citrus fruit, onion, apple

Lutein

Why are used in a food:

* Antioxidants have to be used in oils and fats to prevent rancidity however it occurs in insufficient quantities to prevent oxidative changes. BHA is widely used as an antioxidants in several edible oils, fats, butter essential oils and vitamins oils
* Some important antioxidants are used in foods are:

i) Thiols
ii) Ascorbic acid
iii) Polyphenols
iv) Vitamin A
v) Vitamin E
vi) Catalase
vii) Superoid dismutase
viii) various peroxides

Preservatives

A preservative is a naturally occuring or synthetically produced substances that is added to products such as foods, pharmaceuticals, paints, biological samples wood etc. To prevent decomposition by microbial growth or by undesirable chemical changes.

"Food preservation is any of a number of methods by which food is kept from spoilage after harvest or slaughter."

Oldest methods of preservation:

↳ Drying ↳ Refrigeration ↳ fermentation

Modern methods:

↳ Canning ↳ pasteurisation ↳ freezing ↳ irradiation ↳ and ↳ the addition of chemicals

* Advances in packaging materials have played an important role in modern food preservation.

- most bacteria killed in the rang 82-93°C
many bacterial spores not destroyed even boiling at 100°C → 3 minutes

Sterility — total destruction of bacteria and pores → Temperature of **121°C** wet heat Steam under pressure (as in laboratory Autoclave.

Necessary to Destroy only disease producing bacteria

Pasturize milk

disease producing organisms in milk destroyed by pasturization at 63°C 30 min.
Harmful bacteria in milk that can lead to listeriosis, Typhoid fever, Tuberculosis etc

Cold:-

↳ Yeast, mold, bacteria grow → 10-38°C
(psychrotrophs grow → down 0°C freezing point of water)

* Temperature below 10°C → growth become slower, or more slower the colder it gets
* 96 water in food is compeletly frozen → no multiplication of micro organisms

refrigeration and freezing preservation
↑ principal ← Slowing of microbial activity with temperature

Drying:

is the microorganisms contain excess water 80% get this water from food
96 water is removed from the bacterial cell / multiplication stops
is used as a food preservation technique since decade