agMOOCs

Diet in Cancer

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So we have been seeing the disorders of various organs that occur in the body and how to take care of them, what is the treatment mode, and how to treat by dietary methods and all. Now let us see another lifestyle disease like cancer. So what is the type of diet that has to be taken care in the cancer state.

What is cancer?

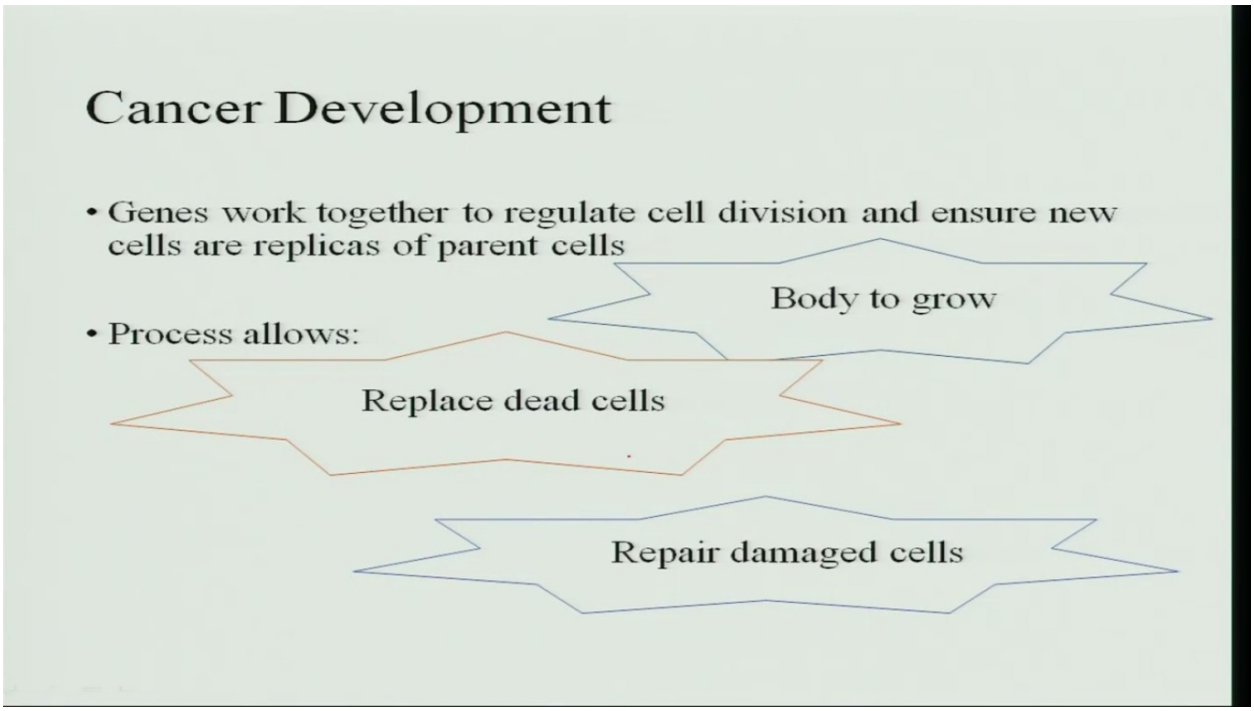
- Cancer means "Crab" for the creeping way in which it spreads
- It is a general term for more than 100 types of malignant neoplastic disease

So when good cells go bad it leads to cancer. So cancer means crap. You must have seen the sign of where crab is given as cancer. So that means it is the creeping way in which it spreads into the body. So it is a general term for more than 100 types of malignant tumors which are neoplastic that means more and more number of cells increase in number.

Cancer not a single disorder

- Many types
- Different characteristics
- Occur in different body locations
- Require different treatments

So it is not a single disorder. There are many types of cancer. They have different characteristics and they occur in different body locations and each type of cancer requires a different type of treatment.



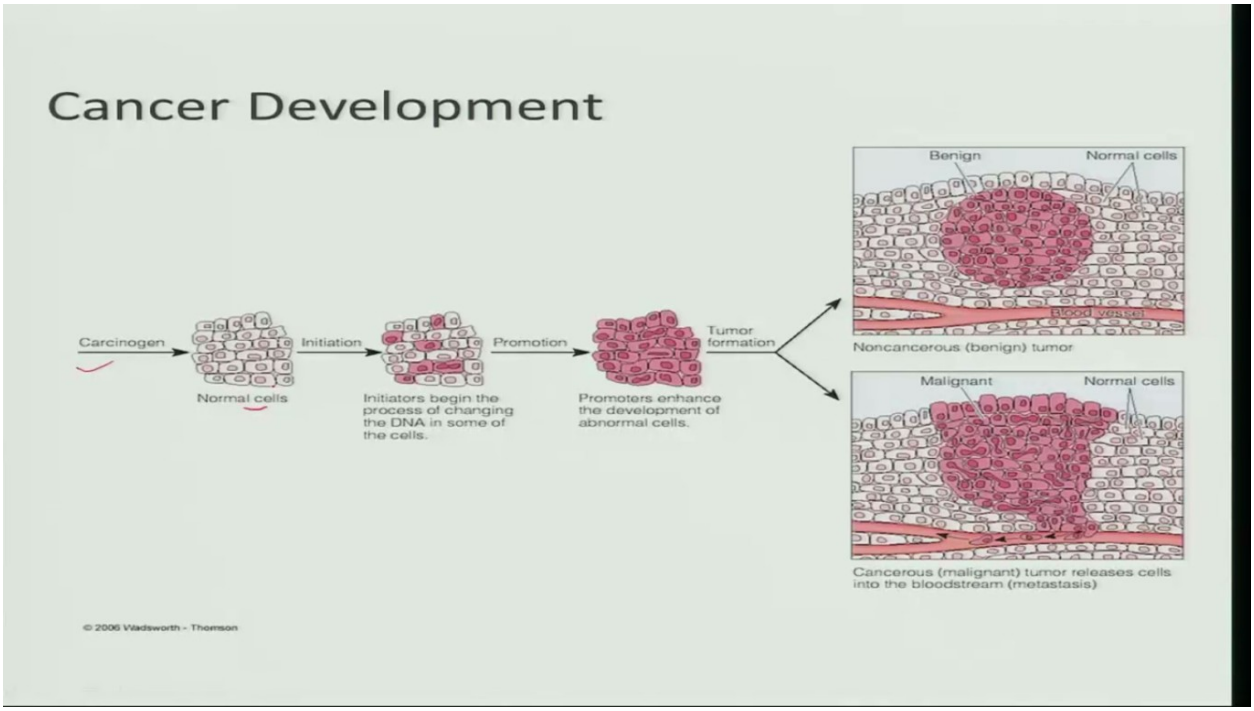
Now the cancer development is normally what happens is the genes work together and regulate the cell division and ensure new cell which are replicas of the parent cells. So this process allows the body to grow and it replaces the dead cells and repairs the damage cell. What our proteins help us in body building. So it helps in growth. It helps in repairing the damaged cells and also it replaces the dead cells that is maintenance of the body. That is a normal course of process that happens in the cells.

- Cancer develops from mutations in genes regulating cell division
  - Mutations inhibit genes that ordinarily monitor and correct errors
  - Affected cells lose ability to stop cell division
- Result is an abnormal mass of cells

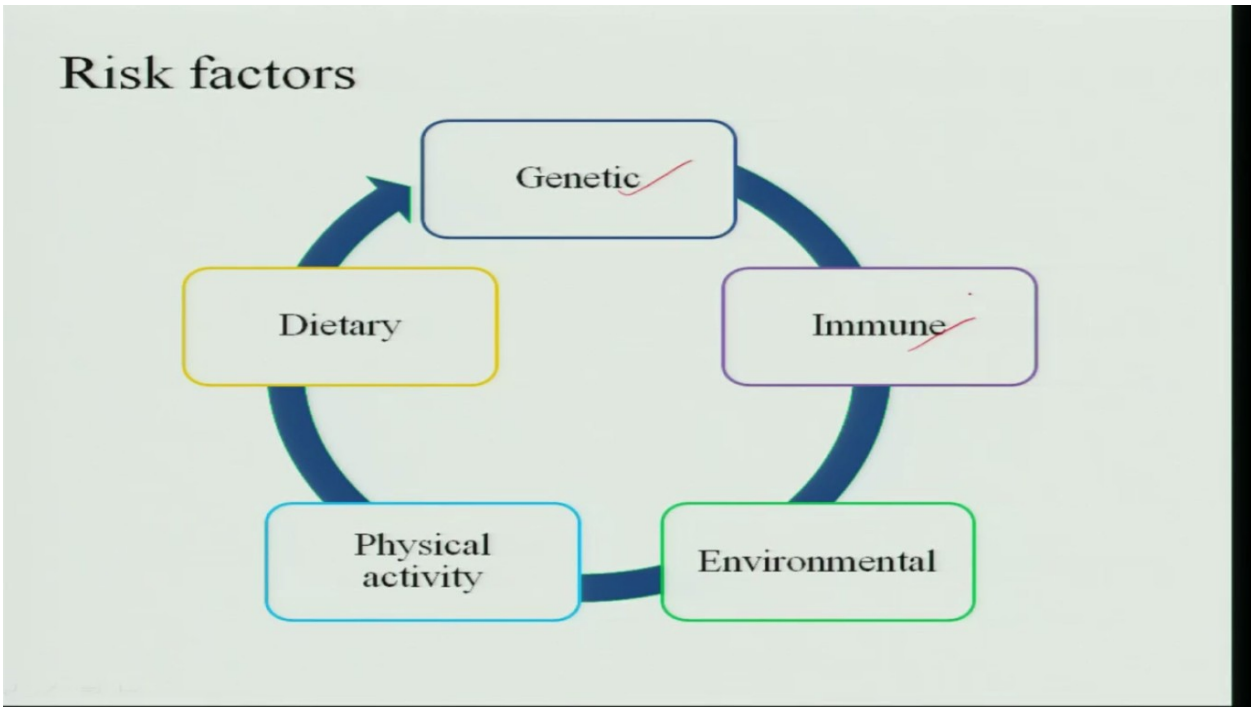
But when cancer occurs it develops mutations from the genes regulating cells and the cells divide based on the changes in the mutations and these mutations inhibit the genes that ordinarily monitor and correct the errors. So the affected cells lose the ability to stop cell division. So once the cell division start it goes on multiplying and multiplying and results in abnormal mass of cells.

- An abnormal mass of cells is called a tumor
  - **Benign**
    - Tumors that stop growing without intervention or can be surgically removed
    - Most often pose no threat to health
  - **Malignant**
    - Tumors that multiply out of control
    - Threaten surrounding tissues and health

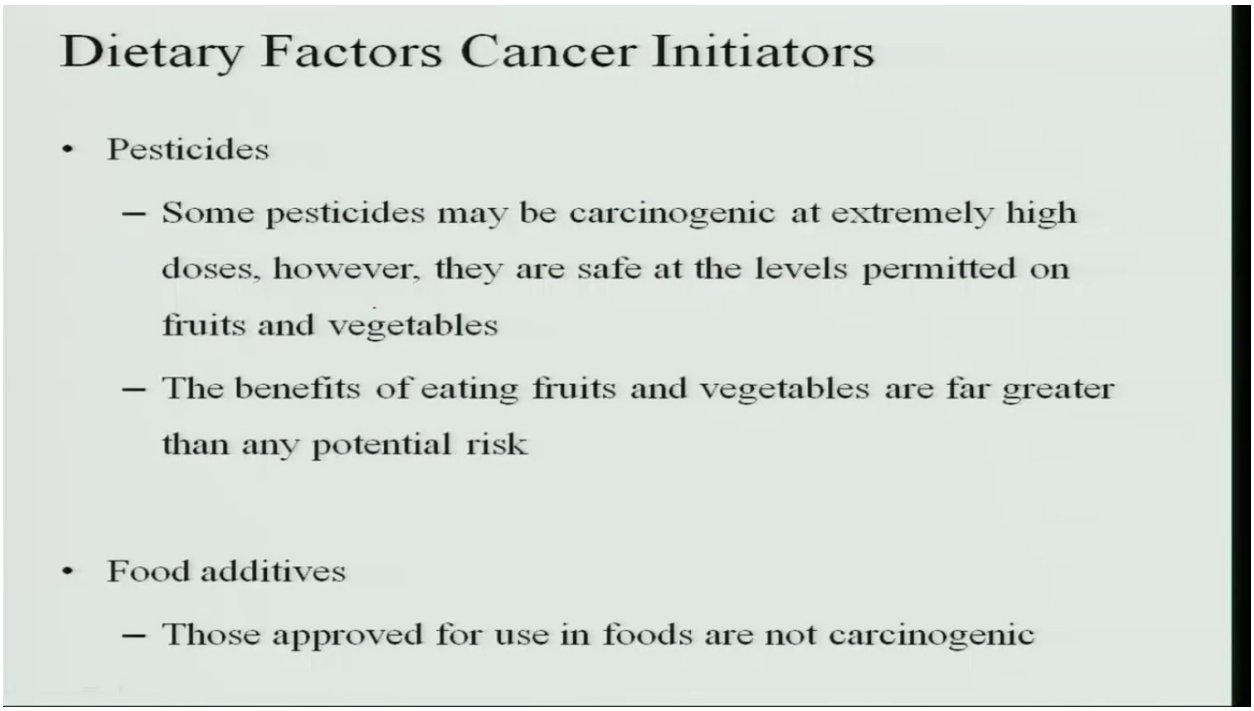
So this abnormal mass of cell that grows in the body is called a tumor. So this tumor can be benign or malignant. Now what is a benign tumor? The tumor that stops growing without intervention. It can be surgically removed without any problem to the body and they most often pose no threat to help. So these are benign cells. They have a limited growth and that part which has grown can be removed surgically without any harm to the body, whereas malignant cells that you must that form they start multiplying out of control and they also start threatening the surrounding tissues and health.



If you see this you can see there is a carcinogen that is entering into the body and it is entering into the normal cells. Now there is an initiation of growth of cells. You can see the number of red cells that are growing. These are all new cells and the promotion occurs. There is uncontrolled multiplication of cells so it slowly increases in size. So tumor formation occurs. If it is a benign tumor you can see it is only a regular part and this can be surgically removed and there is no problem to the body. But if it is a cancerous I mean malignant tumor it keeps on increasing in size. There is uncontrolled multiplication and it can pass through the blood and go to other sides of the body and damage the other parts of the body.



Now risk factors genetically there may be the incidence of growth of cells. Then when the immune system is disturbed and environmentally there are so many things which the environmental pollution or it may be some food, it may be some pesticide. It may be some drugs these may cause and physical activity if you do not have proper physical activity again there is uncontrolled growth of cells. And dietary habits when you have high fat diet, sedentary life, no physical activity these fat cells also the oxidation occurs in the body and there is uncontrolled production of free radicals in the body and the cell wall breaks and there is uncontrolled production of cells leading to tumors.



Now dietary factors. There are certain initiators which are there for cancer one is pesticides. So some pesticides may be carcinogenic. So they may be extremely high doses. So the farmer things I can get more yield and put extremely high dose of pesticides and immediately pluck the fruits or vegetables and then sell them. So actually there is a long period where you have to keep the vegetables and fruits after giving the pesticide so that the effect is lost. So these pesticide residues when they go into the body they are the carcinogens and act on increasing the number of cells. Now the benefit of eating of fruits and vegetables is lost. So now we are at potential risk of getting cancer. Now food additives. So food additives are added to the food to make them attractive in terms of color, flavor, texture and so many ways. So these are also are carcinogenic.

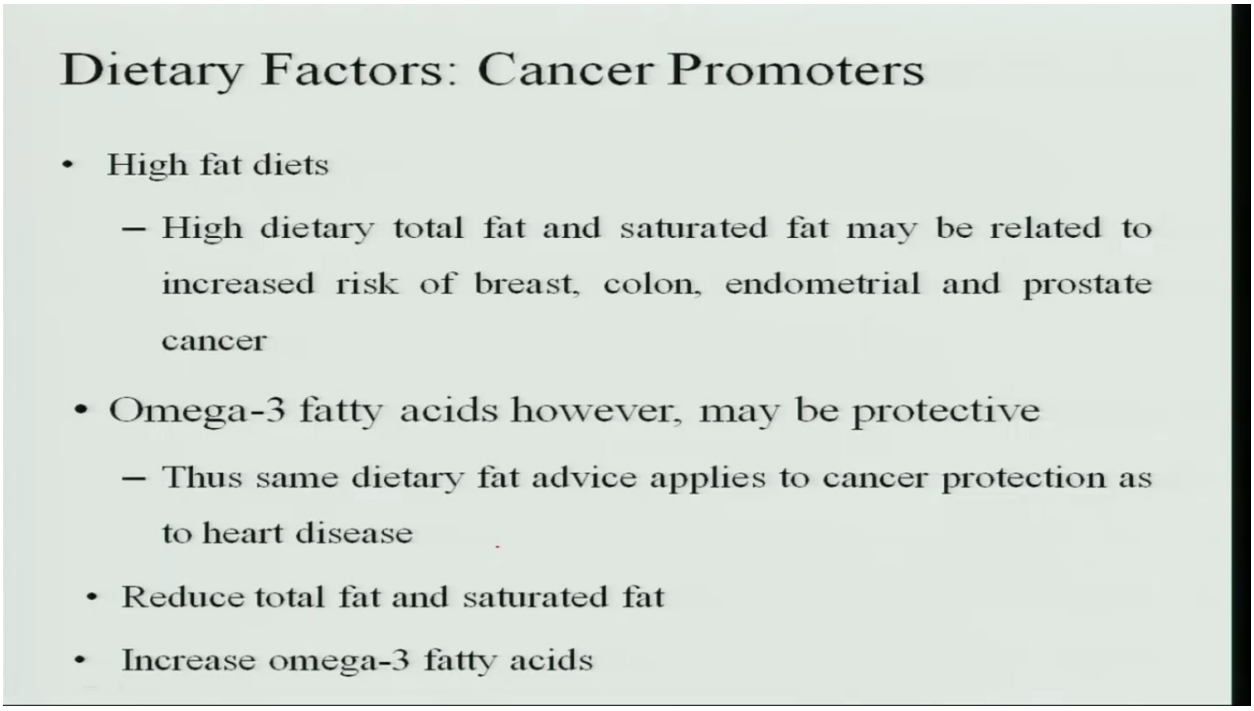
- Alcohol
  - Alcohol associated with increased risk of mouth, esophageal and breast cancer
- Mouth and esophageal cancer are especially increased if alcohol is combined with smoking
- If alcohol intake causes liver cirrhosis, there is an increased risk of liver cancer

Then alcohol. Alcohol is also associated with increased risk of mouth cancer, the esophageal cancer, and breast cancer. Mouth and esophageal cancer especially increased with smoking and if alcohol causes the liver cirrhosis there is an increased chance of after the liver becomes fibrotic and there is necrosis of liver finally it leads to liver cancer.

Food preparation methods

- Cooking meat, poultry, and fish at high temperatures and smoking meat causes carcinogens to form on food surfaces which have been related to cause cancer
  - High heat cooking methods such as grilling, broiling, and barbecuing
- Healthier cooking methods include roasting, broiling, poaching, steaming, stewing, braising and microwaving
- Fruits and vegetables appear to provide a protective effect

Now food preparation methods also add to carcinogens. So cooking meat poultry, fish at high temperatures and smoking meat all these smoked meat products which we eat they form nitrates which are carcinogens and you get a charred portion over the food that also forms the substance to cause cancer. Now high-heat cooking methods like grilling, broiling and barbecuing are very dangerous because they produce lot of carcinogens in them. So healthier cooking methods like roasting, broiling, poaching, steaming, stewing, braising, microwaving; all these are very safe methods of cooking. They do not produce any carcinogens in the food and your food is safe for consumption. There is no change in the cells. Now fruits and vegetables we say because they contain lot of vitamins and minerals they have a protective effect but when they are having lot of pesticides then it is a big question.



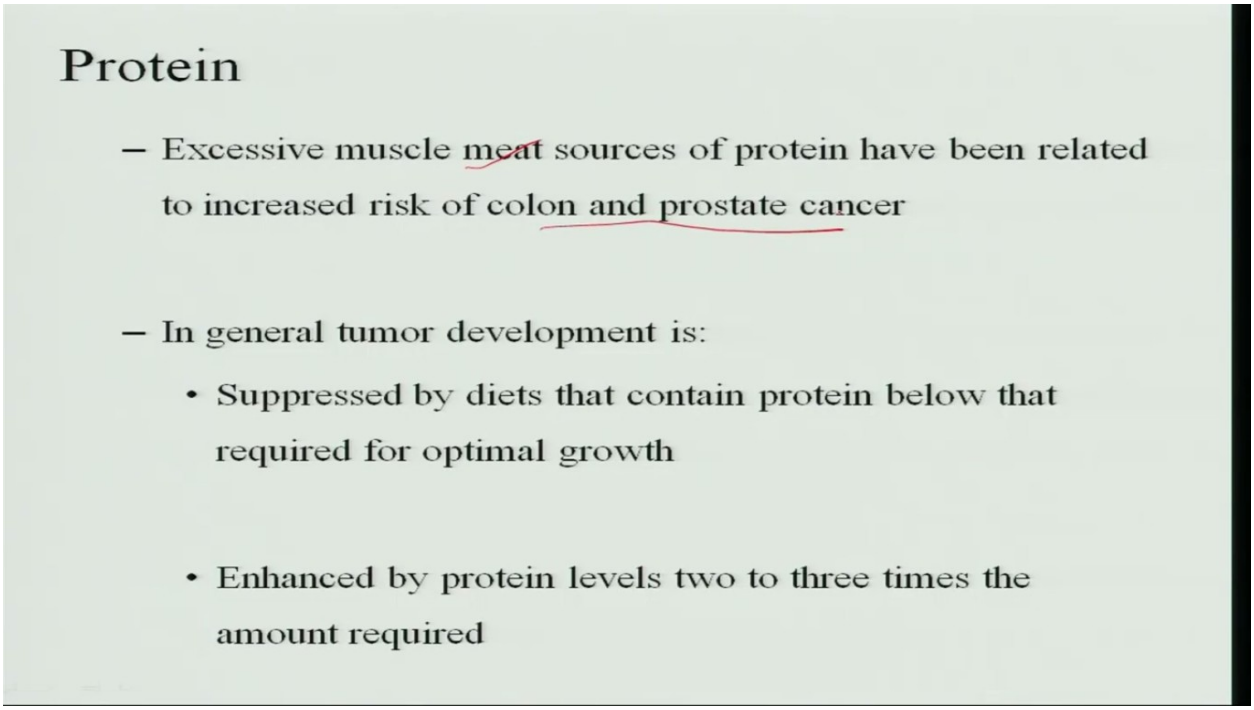
Now dietary factors. Some of them are cancer promoters. So high fat diet is a cancer promoter. So when you have high total dietary fat in which again saturated fat is more so it may be related to breast cancer, colon cancer, endometrial and prostate cancer. Now omega-3 fatty acids or the essential fatty acids or the linoleic acid this may be protective. The omega-3 fatty acids which is present in so many forts however may be protective and the same dietary fat advice applies to the cancer protection as well as heart disease. So what we have to do is you have to reduce the total fat intake as well as the saturated fat intake and increase the amount of omega-3 fatty acids. So omega-3 fats are present in soybean. They are present in fish and they are present in flax seeds.

- High fat diets
  - May increase cancer risk by increasing:
    - Obesity
    - Bile acid production
    - Estrogen levels
  - Because fat is calorie dense it is difficult to distinguish between the effects of high dietary fat, and total calories

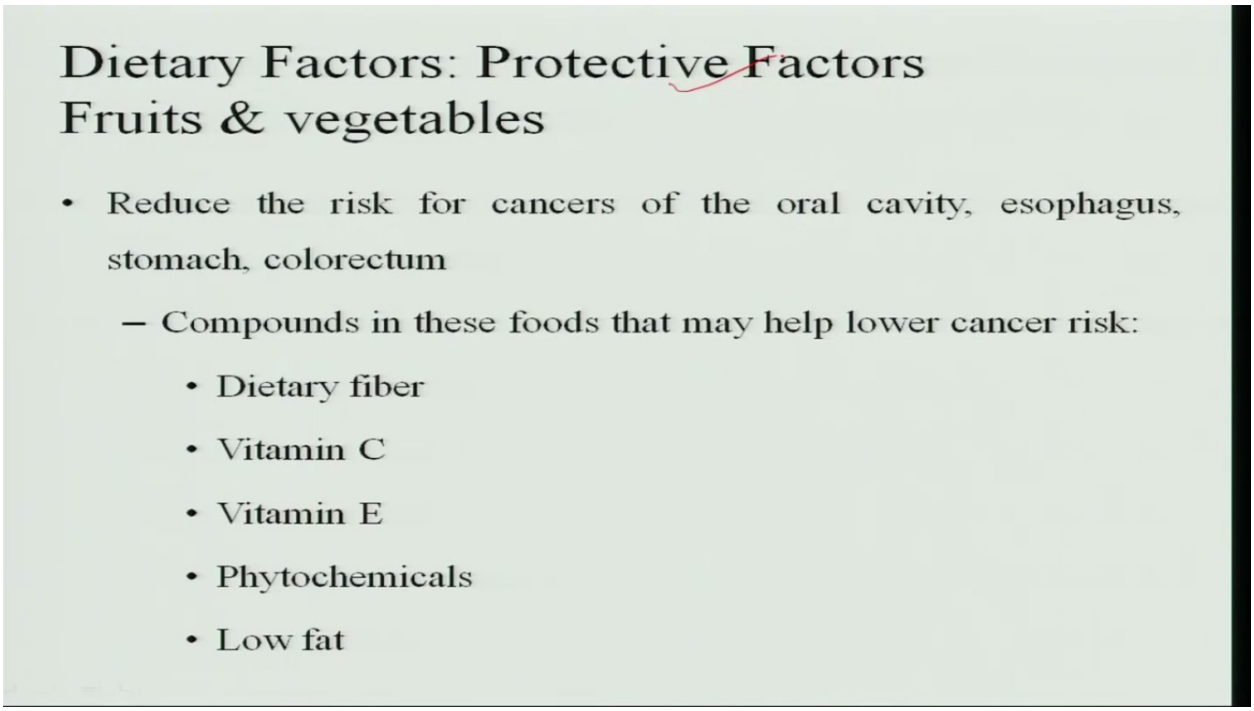
Now high-fat diets also cause cancer. They may increase because high-fat diet leads to obesity, bile acid production, and the estrogen levels also are changed. Therefore, it may lead to cancer and because fat is calorie dense it is difficult to distinguish between high dietary fat and total calories.

- High calorie intake
  - In most epidemiologic studies, a positive association has been seen with high calorie intake and promotion of breast, colon and endometrial cancer
  - Increased risk may be due to:
    - Excess calories themselves
    - Weight gain due to excess calories
    - High fat intake that often supplies excess calories

Now high calorie intake. So positive association between high calorie and promotion of breast cancer and endometrial cancer, colon is seen and you find a lot of number of people having cancer of these types when they have – when they consume high calorie foods. So this incidence maybe because of excess calories themselves or these calories go and get deposited in the adipose tissue and form the fat in the body and increase the weight of the body and high fat also supplies excess of calories. So all these become the risk factor for cancer.



Now protein. Regarding protein excessive muscle meat sources of protein have been related to increase the colon and prostate cancer. That means when we eat protein in limit that is okay but lot of protein causes the risk of colon and prostate cancer. So in general tumor development is suppressed by diets. You can control the tumor by diets which contain protein below the required or optimal growth. So whatever protein is recommended if we take this similar amount in combination with plant and animal protein then the separation of the tumor can occur. Then it is enhanced by protein levels by two or three times. If you consume more than the two or three times the cancer enhancement occurs.



Now dietary factors. We have certain protective factors especially in fruits and vegetables which reduce the risk of cancer especially for the oral cavity, esophagus, stomach and colorectal. If you see all these for organs it is the digestive tract of an individual. So right from the mouth to the anal canal the cancer can be protected by taking more of fruits and vegetables. So compounds in these foods may help in lowering the risk of cancer. So fruits and vegetables contain a lot of dietary fiber and which help the food in passing out of the gastrointestinal system very fast and vitamin C and vitamin E both are antioxidants and the phytochemicals which protect the body against cancer and low fat diet which will help in not producing the carcinogens.

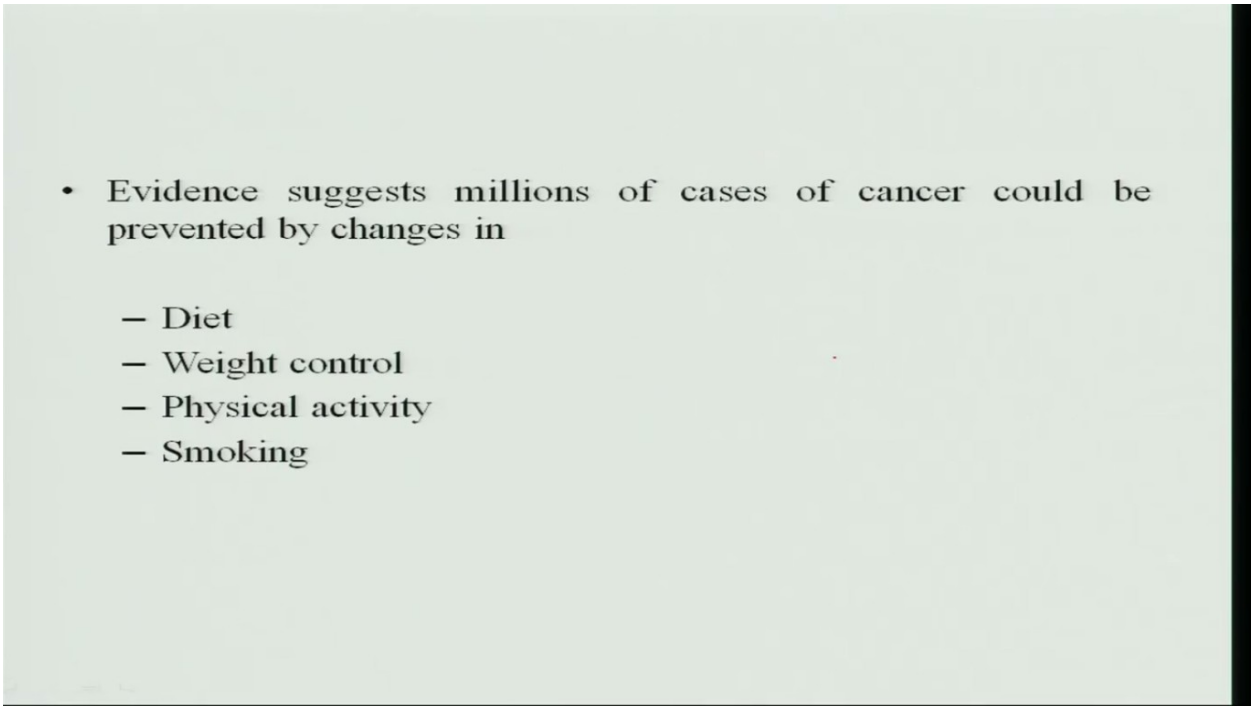
- High fiber diets helps to protect colorectal cancer
- Fiber has been diluting potential carcinogens & speeding their transit through the colon
- Foods high in fiber are typically lower in fat which help to protect against colon cancer by reducing bile acid production

- Evidence suggests millions of cases of cancer could be prevented by changes in
  - Diet
  - Weight control
  - Physical activity
  - Smoking

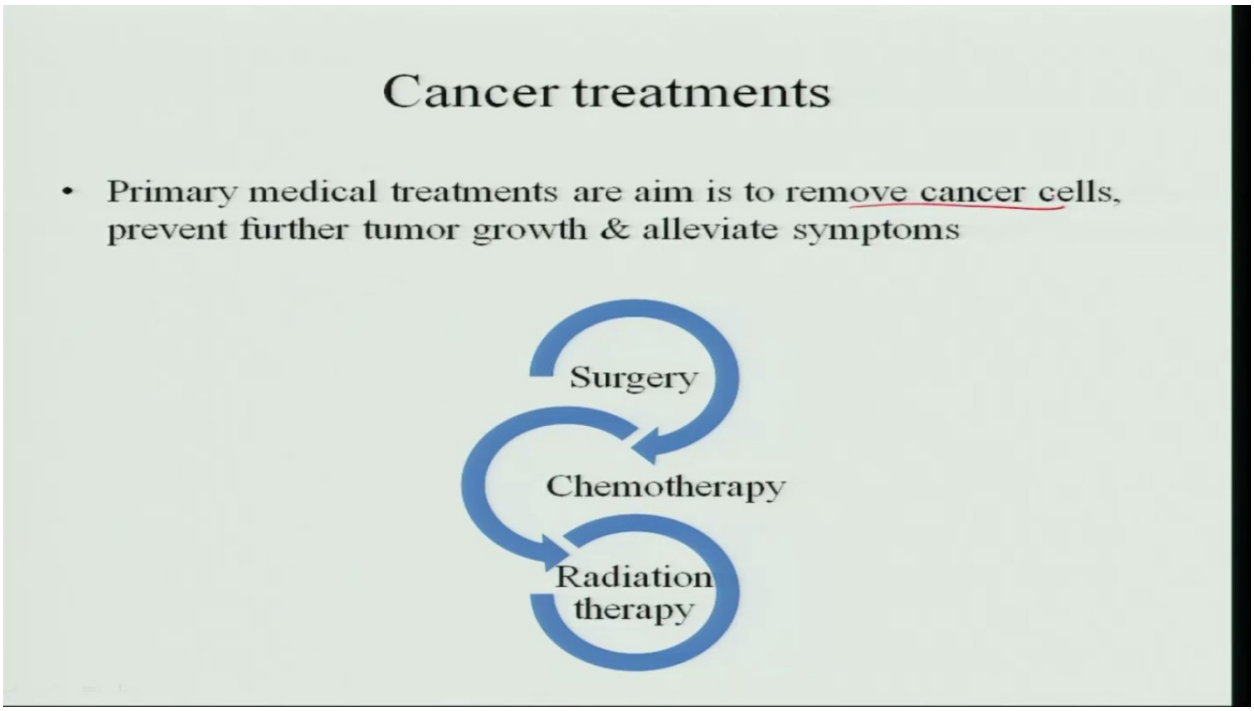
Now intake of high fiber diets protects the colorectal cancer because when the food or after digestion it becomes the residue and remains in the colon and the carcinogens that are present will be absorbed by the large intestine and they enter into the bloodstream and may produce cancer. So when you eat high-fiber diet because there is no problem of constipation, the carcinogens are pushed away along with the excreta and fiber has the potential of diluting

carcinogens and the transit time is increased in the colon. Now foods high in fiber and typically lower in fat they protect against colon cancer by reducing the bile acid production.

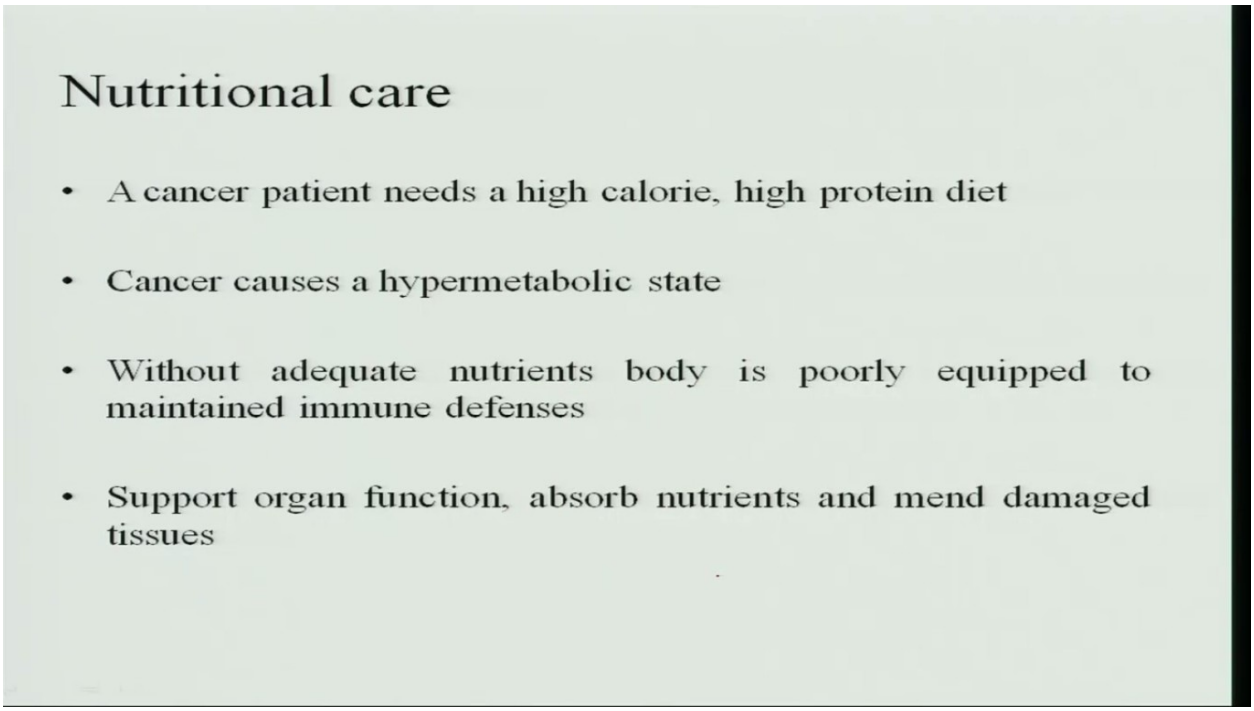
Now there are millions of cases of cancer which can be prevented by changes in diet by controlling the weight, increasing the physical activity, and lowering the smoking.



Now treatment of cancer. The primary medical treatment is to remove the cancer cells and prevent further growth and remove the or stop the symptoms or alleviate the symptoms. So there are three treatments one is surgery. Surgical removal of the growth of the cancer. Then chemotherapy is whatever remaining cells are there they are chemically destroyed and radiation therapy passing the radiation also the remaining whatever cells are remaining are burnt away.



Now nutritional care for these patients are after the surgery you are to give them high calorie, high protein diet because there is lot of muscle wastage in the patient. The protein is lost and the person becomes imitated. Therefore the cancer also causes hypermetabolic state that means more and more energy expenditure occurs. Therefore you have to give high calorie and high protein diet. And without adequate nutrients the body is poorly equipped to maintain the immune defenses. Unless you give them proper protein the immune defense also cannot work properly. And support organ function, absorb nutrients, and mend the damaged tissues; all these are the functions of the protein.



Now energy. The adult with good nutritional status you can give about 2000 kilo calories and for malnourished patient you have to increase the calorie intake so that he has to come back to his normal weight that means you can give up to 45 to 50 kilo calories per kg body weight is recommended. Now protein for an adult with a good nutritional status is 80 to 100 grams. Normally it is for an adult reference man we have seen that the protein requirement is 60 grams per day whereas you can give up to 80 to 100 grams. That means 1 to 1.2 grams per kg body weight with good nutrition can be given and for a malnourished patient you can give 1.3 to 2 grams per kg body weight.

- ENERGY: For an adult with good nutritional status about 2000 kcal & for
- Malnourished patient about 3000-4000 kcal or 45-50 kcal/kg body weight may be recommended

- PROTEIN: For an adult with good nutritional status about 80-100g may be recommended or
- 1-1.2g/kg for those with good nutrition
- 1.3-2g/kg for malnourished patients

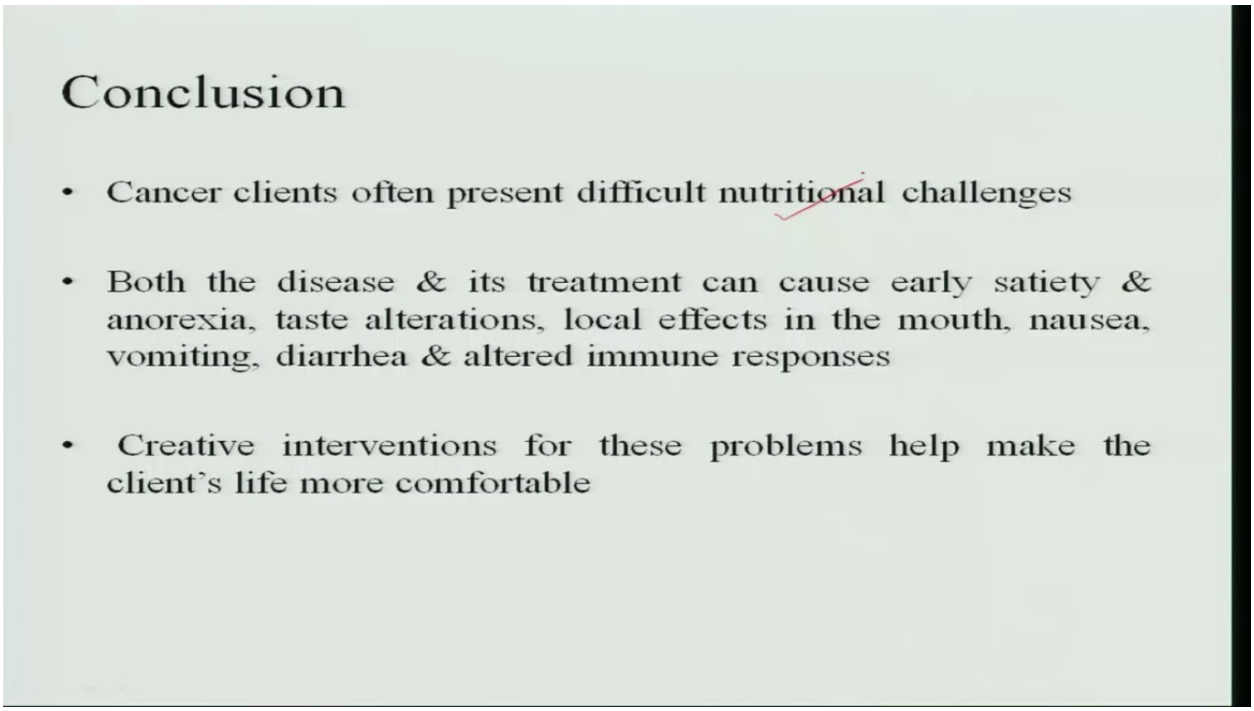
And vitamins and minerals naturally they have to supplement it and optimum intake is recommended. That means whatever is required for a normal person can be given to the persons who is under treatment for cancer and fluid, sufficient fluids need to be ingested.

- Vitamins & minerals

Optimal intake are recommended. There are mounting evidence that vitamins protect against several types of cancer

- Fluid: sufficient fluids need to be ingested

Therefore cancer clients they often present a difficult nutritional challenge because after the treatment there are so many changes in their appetite, in their tastes and so many other body changes occur. Therefore this disease treatment also requires excess of energy and protein for them to come back to their normal state and further prevent the onset of cancer. Therefore, the role of nutrition is very high in preventing and treatment of cancer.



Thank you.