UNIT-II

Topic-2

HERBAL-DRUG AND HERB-FOOD INTERACTIONS

All medicines were derived from natural materials in the ancient time. Most of those early medicines are described under the broad heading “herbs,” although that term may prove misleading. Even though people often think of herbs as plants or plant-derived materials, several commonly used items were obtained from animals and minerals. Further, although the term “herbs” suggests something that is beneficial and has little potential for harm, numerous toxic materials were used, such as foxglove, deadly nightshade, and jimson weed (Datura). Herbalists sometimes processed the herbs to change them from their original form. As the science developed the researchers attempted and succeeded to isolate some active constituents from herbs, so that the end products were not as nature presented them. For example, aconite was processed extensively in China to reduce its toxicity so that it could more readily be used, and borneol, the active constituent found in a few tropical plants, was isolated centuries ago in relatively pure form, a translucent crystal, for both internal and external use. The use of potent and toxic substances and the intentional alteration of natural substances are characteristics of production of modern drugs. Thus, some issues that arise today about interactions of herbs and drugs may have already been encountered in earlier times when herbs were combined with each other.

The ancient Indian system of Ayurveda is practicing in India since 1500 BC; the main aim of this system is to preservation of normal health and curing the diseased one. Ayurveda has focused on patient safety and benefits. In fact it is known that drug safety is a very basic and fundamental concept in medical practice. The current raised issue with respect to Alternative medicine and Ayurveda is increasing reports of Adverse Drug Reaction (ADR) related to herbal medicine. This may be due to increase in number of people taking herbal products either as a medicine or as a nutritional supplement. Such reports many a times neglect to identify the cause behind the event which can be pertaining to variety of issues which are already considered in Ayurveda but are neglected many a times either due to ignorance or negligence. There is misbelief that natural drugs are safe and devoid of toxicity.

5.1 General introduction to interaction and classification

A drug interaction is a change in the action or side effects of a drug caused by concomitant administration with a food, beverage, supplement, or another drug. There are many causes of drug interactions. For example, one drug may alter the pharmacokinetics of another. Alternatively, drug interactions may result from competition for a single receptor or signaling pathway. The risk of a drug-drug interaction increases with the number of drugs used. Over a third (36%) of the elderly in the U.S. regularly uses five or more

medications or supplements, and 15% are at potential risk of a significant drug-drug interaction. When two drugs are used together, their effects can be additive (the result is what you expect when you add together the effect of each drug taken independently), synergistic (combining the drugs leads to a larger effect than expected), or antagonistic (combining the drugs leads to a smaller effect than expected). There is sometimes confusion on whether drugs are synergistic or additive, since the individual effects of each drug may vary from patient to patient. A synergistic interaction may be beneficial for patients, but may also increase the risk of overdose.

Both synergy and antagonism can occur during different phases of the interaction between a drug, and an organism. For example, when synergy occurs at a cellular receptor level this is termed agonism and the substances involved are termed agonists. On the other hand, in the case of antagonism, the substances involved are known as inverse agonists. The different responses of a receptor to the action of a drug has resulted in a number of classifications, such as "partial agonist", "competitive agonist" etc. These concepts have fundamental applications in the pharmacodynamics of these interactions. The proliferation of existing classifications at this level, along with the fact that the exact reaction mechanisms for many drugs are not well-understood means that it is almost impossible to offer a clear classification for these concepts. It is even possible that many authors would misapply any given classification.

Direct interactions between drugs are also possible and may occur when two drugs are mixed prior to intravenous injection. For example, mixing thiopentone and suxamethonium in the same syringe can lead to the precipitation of thiopentone.

The change in an organism's response upon administration of a drug is an important factor in pharmacodynamics interactions. These changes are extraordinarily difficult to classify given the wide variety of modes of action that exist, and the fact that many drugs can cause their effect through a number of different mechanisms. This wide diversity also means that, in all but the most obvious cases it is important to investigate, and understand these mechanisms. The well-founded suspicion exists that there are more unknown interactions than known ones.

5.2 Study of following drugs and their possible side effects and interactions

Hypercium

St. John's wort is a plant with yellow, star-shaped flowers and five petals that grows in Europe, North and South America, Australia, New Zealand, and Eastern Asia. The plant grows in sunny, well-drained areas. It grows to be 50-100 cm tall.St. John's wort might cause serious interactions with some medications. Because of this, France has banned the use of St. John's wort in products. In other countries St. John's wort is only available with a prescription.St. John's wort is most commonly used for "the blues" or depression and symptoms that sometimes go along with mood such as nervousness, tiredness, poor appetite, and trouble sleeping. There is some strong scientific evidence that it is effective for mild to moderate depression.St. John's wort is also used for symptoms of menopause such as hot flashes and moodchanges.Oil can be made from St. John's wort. Some people apply this oil to their skin to treat wounds. Applying St. John's wort directly to the skin is risky. It can cause serious sensitivity to sunlight. For a long time, scientists thought a

chemical in St. John's wort called hypericin was responsible for its effects on improving mood. More recent information suggests other chemicals like hyperforin may play a larger role. These chemicals act on messengers in the nervous system that regulate mood.

kava-kava

Kava is a beverage or extract that is made from Piper methysticum, a plant native to the western Pacific islands. The name "kava" comes from the Polynesian word "awa," which means bitter. In the South Pacific, kava is a popular social drink; similar to alcohol in Western societies. There are some BIG safety concerns about kava. Many cases of liver damage and even some deaths have been traced to kava use. As a result, kava has been banned from the market in Europe and Canada. This ban has hurt the economies of Pacific Island countries that export kava. Despite health concerns, kava has not been taken off the U.S. market. Some people take kava by mouthto calm anxiety, stress, and restlessness, and to treat sleeping problems (insomnia).

It is also used for attention deficit-hyperactivity disorder (ADHD), withdrawal from benzodiazepine drugs, epilepsy, psychosis, depression, migraines and other headaches, chronic fatigue syndrome (CFS, common cold and other respiratory tract infections, tuberculosis, muscle pain, and cancer prevention.Some people also take kava by mouth for urinary tractinfections (UTIs), pain and swelling of the uterus, venereal disease, menstrual discomfort, and to increase sexual desire.Kava is applied to the skin for skin diseases including leprosy, to promote wound healing, and as a painkiller. It is also used as a mouthwash for canker soresand toothaches.Kava is also consumed as a beverage in ceremonies to promote relaxation. Kava affects the brain and other parts of the central nervous system. The kava-lactones in kava are believed to be responsible for its effects.

Ginkgobiloba

Ginkgo is a large tree with fan-shaped leaves. Although Ginkgo is a native plant to China, Japan, and Korea, it has been grown in Europe since around 1730 and in the United States since around 1784. The ginkgo tree is thought to be one of the oldest living trees, dating back to more .Ginkgo leaf is often taken by mouth for memory disorders including Alzheimer's disease. It is also used for conditions that seem to be due to reduced blood flow in the brain, especially in older people. These conditions include memory loss, dizziness, difficulty concentrating, and mood disturbances. Some people use it for leg pain when walking related to poor blood flow .The list of other uses of ginkgo is very long. This may be because this herb has been around for so Ginkgo biloba is one of the longest living tree species in the world. Ginkgo trees can live as long as a thousand years. Using ginkgo for asthma and bronchitis was described in 2600 BCE.In manufacturing, ginkgo leaf extract is used in cosmetics. In foods, roasted ginkgo seed, which has the pulp removed, is an edible delicacy in Japan and China. Ginkgo seems to improve blood circulation, which might help the brain, eyes, ears, and legs function better. It may act as an antioxidant to slow down Alzheimer's disease and interfere with changes in the brain that might cause problems with thinking. Ginkgo seeds contain substances that might kill the bacteria and fungi that cause infections in the body. The seeds also contain a toxin that can cause serious side effects like seizures and loss of consciousness.

Ginseng

Panax ginseng is a plant that grows in Korea, northeastern China, and far eastern Siberia. People use the root to make medicine. Do not confuse Panax ginseng with American ginseng, Siberian ginseng, or Panaxpseudoginseng. See the separate listings for American Ginseng, Ashwaganda, Blue Cohosh, Canaigre, Codonopsis, PanaxPseudoginseng, and Siberian Ginseng.Panax ginseng is taken by mouth to improve thinking, concentration, memory, Alzheimer's disease work efficiency, physical stamina, preventing muscle damage from exercise, and athletic endurance.

Some people use Panax ginseng to help them cope with stress and as a general tonic for improving well-being. They sometimes call Panax ginseng an "adaptogen" when it's used in this way.

Panax ginseng is also used for depression anxiety, general fatigue and chronic fatigue syndrome (CFS), multiple sclerosis for boosting the immune system, and for fighting particular infections in a lung disease called cystic fibrosis. These infections are caused by a bacterium named Pseudomonas.

Some people use Panax ginseng to treat breast cancer and prevent ovarian cancer, liver cancer, lun cancerand skin cancerOther uses include treatment of anemia, chronic bronchitis, swine flu, prediabetesand diabetes, inflammation of the stomach lining (gastritis), fever, hangover, chronic obstructive pulmonary disease (COPD), HIV/AIDS, fertility problems and sexual dysfunction in men, to increase sexual arousal in women, and asthma. Panax ginseng is also used for bleeding disorders, loss of appetite, vomiting, intestinal problems, gallstones, bad breath, fibromyalgia, sleeping problems (insomnia), nerve pain, joint pain, dizziness, headache, hearing loss, convulsions, disorders of pregnancy and childbirth, hot flashes due to menopause, common cold and flu, heart failure, high blood pressure, quality of life, wrinkled skin, and to slow the aging process. Some men apply Panax ginseng to the skin of the penis as part of a multi-ingredient product for treating early orgasm (premature ejaculation).In manufacturing, Panax ginseng is used to makesoaps, cosmetics, and as a flavoring in beverages.Panax ginseng contains many active substances. The substances thought to be most important are called ginsenosides or panaxosides. Ginsenosides is the term coined by Asian researchers, and the term panaxosides was chosen by early Russian researchers.Panax ginseng is often referred to as a general well-being medication, because it affects many different systems of the body.

Garlic

Garlic is an herb that is grown around the world. It is related to onion, leeks, and chives. It is thought that garlic is native to Siberia, but spread to other parts of the world over 5000 years ago. Garlic is used for many conditions related to the heart and blood system. These conditions include high blood pressure, low blood pressure, high cholesterol, inherited high cholesterol, coronary heart disease, heart attack, reduced blood flow due to narrowed arteries, and "hardening of the arteries" (atherosclerosis). Some people use garlic to prevent colon cancer, rectal cancer, stomach cancer, breast cancer, prostate cancer, multiple myeloma, and lung cancer. It is also

used to treat prostate cancer and bladder cancer. Garlic has been tried for treating an enlarged prostate (benign prostatic hyperplasia; BPH), cystic fibrosis, diabetes, osteoarthritis, hay fever (allergic rhinitis), and traveler's diarrhea, high blood pressure late in pregnancy (pre-eclampsia), yeast infection, flu, and swine flu. It is also used to prevent tick bites, as a mosquito repellant, and for preventing the common cold, and treating and preventing bacterial and fungal infections. Garlic is also used for earaches, chronic fatigue syndrome, menstrual disorders, abnormal cholesterol levels caused by HIV drugs, hepatitis, shortness of breath related to liver disease, stomach ulcers caused by H. pylori infection, exercise performance, exercise-induced muscle soreness, a condition that causes lumps in the breast tissue called fibrocystic breast disease, a skin condition called scleroderma, and lead toxicity.Other uses include treatment of fever, coughs, headache, stomach ache, sinus congestion, gout, joint pain, hemorrhoids, asthma, bronchitis, shortness of breath, low blood sugar, snakebites, diarrhea and bloody diarrhea, tuberculosis, bloody urine, a serious nose and throat infection called diphtheria, whooping cough, tooth sensitivity, stomach inflammation (gastritis), scalp ringworm, and a sexually transmitted disease called vaginal trichomoniasis. It is also used for fighting stress and fatigue. Some people apply garlic oil to their skin or nails to treat fungal infections, warts, and corns. It is also applied to the skin for hair loss and thrush.Garlic is used in the vagina for yeast infections.Garlic is injected into the body for chest pain. In foods and beverages, fresh garlic, garlic powder. Garlic produces a chemical called allicin. This is what seems to make garlic work for certain conditions. Allicin also makes garlic smell. Some products are made "odorless" by aging the garlic, but this process can also make the garlic less effective. It's a good idea to look for supplements that are coated (enteric coating) so they will dissolve in the intestine and not in the stomach.

Pepper

Black pepper and white pepper are made from the Piper nigrum plant. Black pepper is ground from dried, whole unripe fruit. White pepper is ground from dried, ripe fruit that has had the outer layer removed. The black pepper and white pepper powder are used to make medicine. People take black pepper for stomach upset, bronchitis, and cancer. They take white pepper for stomach upset, malaria, cholera, and cancer.Black pepper is sometimes applied directly to the skin for treating nerve pain (neuralgia) and a skin disease called scabies. Black pepper and white pepper are also used topically as a counterirritant for pain.In foods and beverages, black pepper, white pepper, and pepper oil (a product distilled from black pepper) are used as flavoring agents. Black and white pepper might help fight germs (microbes) and cause the stomach to increase the flow of digestive juices. There is conflicting evidence about their role in cancer. Some evidence suggests pepper might protect against colon cancer, but other evidence suggests it might promote liver cancer.

Ephedra

Ephedra is an herb. Usually, the branches and tops are used to make medicine, but the root or whole plant can also be used. Ephedra is banned in the U.S. due to safety concerns.Mormon tea and ephedra are often confused. Mormon tea or American ephedra comes from Ephedra nevadensis, and ephedra or ma huang comes primarily from Ephedra sinica. Mormon tea lacks the chemicals (notably ephedrine) that give ephedra its effects and potentially serious side effects.Ephedra is used for weight loss and obesity and to enhance athletic performance. It is also used for allergies and hay fever; nasal congestion; and respiratory tract conditions such as bronchospasm, asthma,

and bronchitis. It is also used for colds, flu, swine flu, fever, chills, headache, inability to sweat, joint and bone pain, and as a “water pill” to increase urine flow in people who retain fluids. There has been a lot of debate about the safety of ephedra and legal wrangling over its status.

In June 1997, the FDA proposed restrictions on the ephedrine content of dietary supplements, new warning labels for products that contain the active ingredients in ephedra and a ban on combination products containing ephedra and other natural stimulants, such as guarana and cola nut, both of which contain significant amounts of caffeine. These proposals were dropped after the link between ephedra use and serious adverse effects was challenged by the General Accounting Office (GAO) and the dietary supplement industry. According to the Dietary Supplement Health and Education Act of 1994, FDA must prove a supplement is unsafe before it can be withdrawn from the market. The FDA reviewed numerous adverse event reports involving ephedra-containing products, with 140 of the reports receiving in-depth clinical review by FDA and outside experts. Findings from experts outside the FDA support the FDA's initial finding that ephedra is likely the cause of many of the events noted in the reports.On December 30, 2003, the FDA announced the ban of ephedra products in the U.S., effective April 2004. In April 2005, the dietary supplement industry successfully challenged the FDA ban on ephedra. A year after the ban on ephedra began, a federal judge in Utah struck down the FDA's action saying that FDA didn't prove that low doses of ephedra are harmful. In August 2006, an appeals court reversed the Utah judge's decision and upheld the FDA's ban of ephedra-containing dietary supplements.Ephedra use is banned by the National Collegiate Athletic Association, International Olympic Committee, and National Football League.Ephedra is sometimes marketed as a recreational drug "herbal ecstasy." The FDA has announced that ephedra products marketed as recreational drugs are unapproved and that misbranded drugs.
Ephedra contains a chemical called ephedrine. Ephedrine stimulates the heart, the lungs, and the nervous system.