**St Peter’s Institute of Pharmaceutical Sciences**

**Course: Bachelor of Pharmacy**

**Subject: Herbal Drug Technology**

**Subject Code: BP603T**

**Herb drug and herb food interaction**

Drug interaction is a reaction among two or more drugs or between a drug and a food, beverage or supplement inside the body.

Drug interaction can make the drug is less effective or increased activity or cause unwanted side effects.

**Types of Drug Interactions**

* Drug-drug interaction
* Drug-food interaction
* Drug-disease interaction
1. **Drug-drug interaction**

These are common type of drug interaction. The more drugs that administered, greater the chance that the drugs will interact with each other. One drug may potentiate the activity of another or inhibit its activity or sometimes it causes serious unexpected side effects may occur.

**Eg:** Vicodin a pain killer when taken in combination with an antihistamine drug, Benadryl produces an additional drowsiness effect.

1. **Drug-food interaction**

This is another type of drug interaction where drugs interact with food/ beverages and can produce a variety of side effects.

**Eg:** Grape juice reduces the enzyme activity in liver which is responsible for metabolising drugs thus leading to an increase in the levels of certain drugs such as cholesterol-lowering drugs (statins), this leads to toxic side effects such as muscle pain and injury

**Drug-disease interaction**

Sometimes drugs also interact with certain diseases where the disease alter the way a drug works.

**Eg:** Oral decongestants like pseudoephedrine; phenylephrine can raise blood pressure and can be dangerous for patients with high blood pressure.

**Mechanism of drug interactions**

1. Pharmacodynamic
2. Pharmacokinetic
3. Absorption
4. Distribution
5. Metabolism
6. Excretion

**Pharmacodynamic interaction:**

This occurs when two or more drugs administered together act at the similar receptor sites leading to enhancement (additive or synergistic) effects or decreased (antagonistic) effects.

Eg: Chlorpromazine given to prevent nausea and vomiting combined with anti-psychotic drugs such as haloperidol and produces a very serious and potentially dangerous heart rhythm.

 **Pharmacokinetic interaction:**

This occurs when drugs interact during the process of absorption, distribution metabolism or excretion.

**a. Absorption interactions:**

Some medicines can change the absorption of other medicines, for example calcium can bind to other drugs such as tetracycline and HIV drug dolutegravir and prevent its absorption which is why these drugs should not be taken in combination with milk and antacids.

1. **Distribution interactions:**

One or more drugs can compete with each other for plasma protein binding sites resulting in displacement of one drug thereby increasing its blood levels and toxicity.

**Eg:** fenofibric acid (cholesterol eyeing agent) and warfarin (blood thinner) when combined, compete with protein binding sites that lead to the transport and increase in blood levels of warfarin thus leading to bleeding.

1. **Metabolism interactions:**

Enzymes in the liver such as cytochromes are responsible for metabolising drugs and eliminating them from the body. Some drugs may alter the enzyme levels or its activity resulting in fast or slow metabolism of drugs.

**Eg:** Diltiazem (antihypertensive) inhibits cytochromes enzyme responsible for the use of simvastatin (hypocholestremic) and increases its blood levels leading to adverse effects on the liver and muscles.

1. **Excretion interactions:**

Some non-steroidal anti-inflammatory drugs (NSAID's) such as indomethacin can reduce kidney function and reduce the release of lithium, a drug used for bipolar disorder. In such cases dose adjustment is required.

**Study of common herbs and their interactions**

1. **St. John’s wort** and its extracts are prepared from the aerial parts of *hypericum perforatum* containing several pharmacologically active ingredients, including naphthodianthrones, phloroglucinol derivatives and flavonoids.

 It is a popular herb that is used to treat mild to moderate depression. The active ingredient of this herb is known as hypericin**,** which has the same effects on the brain as those of MAO- inhibitors (antidepressants). This extract inhibits serotonin, dopamine and norepinephrine reuptake.

**Drug interactions with St. John's Wort (Hypericum perforatum)**

|  |  |  |
| --- | --- | --- |
| **HERB** | **DRUG** | **EFFECT OF INTERACTION ON DRUG** |
| Hypericum | HIV protease inhibitors (indinavir, saquinavir) | Reduced blood levels with possible loss of HIV suppression. |
| Hypericum | HIV non-nucleoside reverse transcriptase inhibitors(efavirenz, nevirapine)  | Reduced blood levels with possible loss of HIV suppression |
| Hypericum | Warfarin |  reduced anticoagulant effect and need for increased warfarin dose |
| Hypericum | Immunosuppressant(cyclosporine, tacrolimus) | reduced blood levels with transplant rejection |
| Hypericum | Anticonvulsants (carbamazepine, phenobarbitone, phenytoin) | Reduced blood levels with risk of seizures  |
| Hypericum | Digoxin | Reduced blood levels have been reported. Theoretical loss of control of heart rhythm  |
| Hypericum | SSRIs and related antidepressants(citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline | Increased serotonergic effects with risk of increased incidence of adverse reactions. |
| Hypericum | Theophylline | Reduced blood levels and loss of bronchodilator effect |

**Side Effects**

* Mild stomach upset
* Diarrhoea
* Dry mouth
* Headache
* Dizziness
* Anxiety
* Restlessness
* Allergic skin reactions
* Sexual or erectile dysfunction
* Vivid dreams
* Liver injury

**2. Kava (*Piper methysticum*)**

Kava extract obtaines from the rhizome of the kava plant (*Piper methysticum*). It is used as antianxiolytic, pain relieving, muscle relaxing and anticonvulsant properties.

**Prolonged use of kava can lead to**:

1. -Liver problems.
2. -Shortness of breath (reversible).
3. -Scaly rash (reversible).
4. -Facial puffiness or swelling (reversible)

**Drug interactions:**

* Alcohol, other lubricants, muscle relaxants, dopamine, haloperidol, acetaminophen, and benzodiazepines. Taking kava with alcohol, other stimulants, or muscle relaxants can lead to additional effects including coma.
* Kava deals with alcohol. Drinking alcohol while taking kava can increase a person's risk of liver damage.
* Kava can interfere with the effects of dopamine and drugs such as dopamine and may worsen the side effects of dopamine-blocking drugs, such as haloperidol.
* Psychotropics and anesthesia. Kava can contain chemical elements such as monoamine oxidase inhibitors (MAOIs), and can add to the effects of MAOI antidepressants, such as isocarboxazid, phenelzine. Therefore, kava should not be used with MAOIs**.**
* Kava can cause excessive drowsiness when taken with SSRI anti-depressant medications such as fluoxitine or sertraline. Kava can also cause anesthesia to last longer and its use should be careful.

**Side effects:**

* Allergic [skin](https://www.rxlist.com/script/main/art.asp?articlekey=7901) reactions
* [Dizziness](https://www.rxlist.com/script/main/art.asp?articlekey=6114)
* Drowsiness
* Enlarged pupils
* [Gastrointestinal](https://www.rxlist.com/script/main/art.asp?articlekey=3555) upset
* [Headache](https://www.rxlist.com/script/main/art.asp?articlekey=11396)
* [Hepatitis](https://www.rxlist.com/script/main/art.asp?articlekey=3705) ([acute](https://www.rxlist.com/script/main/art.asp?articlekey=2133))
* [Liver](https://www.rxlist.com/script/main/art.asp?articlekey=4179) damage

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