PHARMACY PRACTICE

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DEPARTMENT OF PHARMACY PRACTICE

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News Letter

BASIC CONCEPTS OF IMMUNIZATION

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In order to understand the basic concepts of Immunization, it is essential to know how human body responds to the different types of vaccines. Vaccines are defined as whole or part of micro- organisms administered to prevent an infectious disease. Vaccines can consist of:

a. Live attenuated micro organisms

   e.g: Measles, MMR, Rotavirus, Varicella and live attenuated influenza vaccines.

b. Whole inactivated micro-organisms (IPV, Hep A, Whole cell pertussis vaccines)

c. Proteins which are part of micro-organisms(e.g: HbsAg in Hep B, Toxoids in DT, Pertussis toxin in acellular pertussis)

d. Polysaccharide vaccines (e.g.Pneumococcal polysaccharide vaccines, Typhoid polysaccharide vaccines)

e. Polysaccharide conjugated to protein carriers (e.g. Pneumococcal and meningococcal conjugate vaccines, Hib vaccine)

1). What happens when a vaccine is first administered to a person?

When a vaccine enters the body, it first triggers the innate immunity which is comprised of Dendrite cells, Monocytes and Neutrophils. These activated cells change their surface receptors and migrate along the lymphatic channels to the draining lymphnodes where depending on the type of antigen, they activate either B lymphocyte alone or both T & B lymphocytes. The stimulation of T and B lymphocytes results in adaptive immunity which is antigen specific. Adaptive immunity is antigen specific because it produces antibodies that react specifically to those particular antigens. Some antigens like Polysaccharide vaccines can activate only B lymphocytes and they are called T cell independent antigens whereas vaccines containing protein particles or polysaccharide conjugate vaccines can stimulate both B and T lymphocytes and they are called T-cell dependent antigens.

2) What happens when a polysaccharide vaccine enters human body?

On release from injection site, these antigens reach the marginal zone of the spleen or lymph nodes and bind to the specific Ig surface receptors of B cells. In the absence of antigen specific helper T cells and B cells are activated and they proliferate differentiation to plasma cells. The antibody response that results in 2-4 weeks following immunization is predominantly IgM with low titres of low affinity IgG .This is called primary immune response. Half-life of plasma cells is short and antibody titres decline rapidly. These antigens are unable to evoke an immune response in those aged less than 2 years due to immaturity of the Marginal zone. Since no memory B cells are formed re-exposure to the same polysaccharide results in a repeat primary response that follows the same kinetics as in an initial exposure.

3). What happens when a protein or a conjugated polysaccharide vaccine enters the body?

Initial response is similar to Polysaccharide antigens but there is activation of antigen specific helper T cells by antigen bearing dendritic cells,which in turn causes some antigen specific B cells to migrate towards follicular dendritic cells (FDC'S) initiating the germinal Centre (GC)reaction. In GC's B cells receive additional signals from follicular T cells and undergo massive clonal proliferation,switch from IgM to IgG /IgA,undergo affinity maturation and differentiate into plasma cells secreting large amount of antigen specific antibodies. Most of the plasma cells die at the end of germinal centre reaction and thus decline in antibody levels is noted 4-8 weeks after vaccination . Few plasma cells exit lymph nodes/spleen and migrate to bone marrow where they survive through signal provided by supporting stromal cells. This is the reason for prolonged and persistence of antibodies.During germinal centre reaction some B cells become memory B cells and they persist as resting cells. These B cells when they are exposed to their specific antigen will readily proliferate and differentiate into plasma cells secreting large amount of high affinity antibodies. This is what is called secondary immune response.An important fact which has a practical implication is that vaccines other than live attenuated vaccines (polysaccharides, proteins, and whole cell killed vaccines) elicit focal lymphnode activation. Therefore multiple killed vaccines can be administered simultaneously at anatomically different sites without immunologic interference.

4). What happens in case of live attenuated vaccines?

The live vaccines induce an immune response similar to that seen with protein vaccines. But there is multi-focal lymphnode activation due to microbial replication and dissemination which provides a constant source of the antigen. However the take of live vaccines is not 100% with the first dose, hence more than one dose is recommended with most live vaccines. The second dose of the vaccine is for primary vaccine failure (no uptake of vaccine) and not for secondary vaccine failure (decline in anti-bodies over time). Since live vaccines cause multi focal lymphnode activation immunologic interference may occur with multiple live vaccines unless they are given simultaneously or atleast 4 weeks apart.

5). What should be the ideal spacing between multiple doses of same vaccine?

The best vaccination schedule for non-live T-cell dependent vaccines is 0-1-6 months. First two doses are for induction of immunity and the gap between second and third dose allows time for maturation of B-cells in germinal centers and formation of memory B-cells which usually takes atleast 4-6 months. Immunization schedules commencing at 2 months and having 2 months spacing between doses (2-4-6 months) are technically superior to 6-10-14 weeks schedule. However for operational reasons 6, 10 and 14 weeks schedule is taken in developing countries.

6). What should be the spacing of different vaccines?

Two or more inactivated vaccines can be given simultaneously or at any interval between doses .Inactivated and live vaccines can be given at any interval between doses or simultaneously .But two or more live injectable or nasal vaccines should have an interval of four weeks if not administered simultaneously. Possibility that 2 doses of the same or different live virus vaccines administered with in too short, an interval may inhibit the immunological response to the second dose is based on evidence from both animal and human studies. If parentally or nasally administered live virus vaccines are separated by less than 4 weeks, readministration of live virus vaccine given second should be considered. OPV, rotavirus and oral typhoid vaccines are exceptions to this and may be given at any time in relation to any live or inactivated vaccine.

7). How many different vaccines can be administered simultaneously?

Any number of vaccines can be given simultaneously on the same day, but it should be at different anatomic sites. Vaccines licensed for injection in the same syringe can be given together. If more than one vaccine to be administered in a single limb of a young child, the thigh is usually preferred because of its large muscle mass. The distance separating two injections in the same limb should be 1-2 inches to minimize the chance of overlapping local reactions. These facts have special significance in case catch up vaccination.

Comprehending the body's response to different types of vaccines is essential for understanding the vaccination schedule. Hope now the reader is able to appreciate why different vaccines have different doses and schedules.

DEPARTMENT ACTIVITIES

1. **Pulse Polio Immunization Programme**

   Our Pharm D students volunteered National Pulse Polio Immunization Programme held on 17th, 18th & 19th January and 21st & 22nd February 2016.

2. **Medical Camp**

   St. James Hospital in association with Kerala Police Department organized a Medical Camp at Malakkapara on 24-01-2016.Our Pharm D and M Pharm Pharmacy Practice students actively participated in organizing the camp.

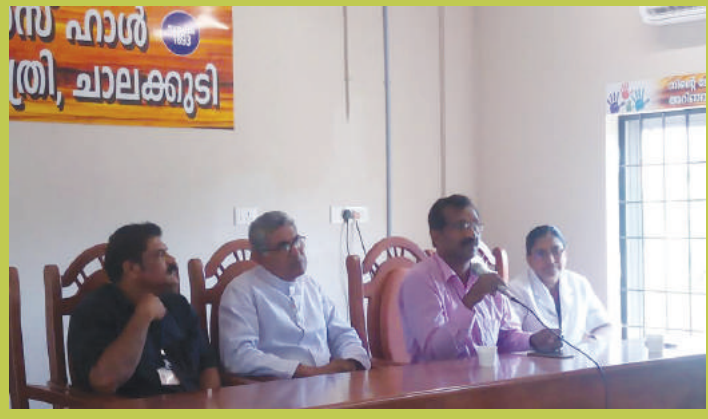
3. **Hospital Formulary**

   Department of Pharmacy Practice released Drug Formulary of St. James Hospital during the Decennial celebration of St. James college of Pharmaceutical Sciences.

4. **Orientation programme at Govt. Taluk Hospital**

   Department of Pharmacy Practice extended our clinical activities to Government Taluk Head Quarters Hospital at Chalakudy. An orientation programme was held at the Government Hospital on 01-02-2016.

   This provided an opportunity for our students to expand their clinical services among lay people.



5. **World Cancer Day**

   Department of Pharmacy Practice organized a seminar on World Cancer Day on 4th Feb 2016 in association with Oushadhavijnan, the Journal club of St. James college of Pharmaceutical Sciences.

6. Indian Congress of Pharmacy Practice 2016

St. James College of Pharmaceutical Sciences was one of the organizing institutions of Indian congress of pharmacy practice 2016 and 2nd convention of IACP held on 2nd and 3rd April 2016 at hotel Le Meridien, Coimbatore. Our staff members and Pharm D students were actively participated in the convention.

7. Seminar

Dr.K.Krishnakumar, Principal, St.James College of pharmaceutical Sciences and Dr.L.Panayappan, HOD, Department of Pharmacy Practice delivered talks on "Review on drug action and How to start a retail pharmacy" respectively during the National Seminar held at Cherraan's college of pharmacy, Coimbatore on 29-04-16.

PATIENT COUNSELING DETAILS

WARD	DIABETES MELLITUS	HYPERTENSION	PEPTIC ULCER	BRONCHIAL ASTHMA	DENGUE FEVER	HYPER THYROIDISM	URINARY TRACT INFECTION	APPENDICITIS	STROKE	ACUTE GASTRO ENTERITIS	DYSLIPIDIMIA	OSTEOPOROSIS	OBESITY	RHEUMATOID ARTHRITIS
GENERAL	26	28	1	11	6	1	4		4	3	5		5	
SURGERY	13	6	2			2		5						
GYNAECOLOGY	1	2				1	3							
ORTHOPAEDIC	1	6	2	1		1					2	5		6
CARDIAC	11	7		1		1	4		1		4		3	
PAEDIATRIC							2			2				

DRUG INFORMATION DETAILS

GENERAL	INDICATION	ADVERSE DRUG REACTION	MECHANISM OF ACTION	DOSE	INTERACTIONS
55	5	4	2	4	3

ADR REPORTED IN THE DEPARTMENT

The following are some of the adverse drug reactions either reported to or detected by the department of pharmacy practice

DRUGS	CATEGORY	ROUTE	NATURE OF ADR
Ampicillin	Antibiotic	Oral	Shivering, Fever And Hypotension
Moxifloxacin	Antibiotic	IV	Itching At The Sight Of Injection
Nifedipine	Antihypertensive	Oral	Head Ache
Methyl prednisolone	Anti inflammatory	Oral	Erythema
Glimepiride	Hypoglycemic	Oral	Hypoglycaemia
Amoxicillin	Antibiotic	IV	Diarrhoea

SEMINARS

1. Dr.L.Panayappan & Dr. Jayaprakash attended "QIP on Prospective Approach of Biotechnology in Modern Research Organization" by Department Of Pharmaceutical Biotechnology on 15th-21st February 2016 at JSS College of Pharmacy,Ootacaumund

2. Mrs.Lincy George and students of pharmacy practice department attended seminar on "Combating emerging infectious diseases -A pharmaceutical approach" conducted by Moulana College of Pharmacy , Perinthalmanna, Malapuram, sponsored by Kerala State Council for Science, technology and environment on 5th March 2016.

3. On 10th & 11th March 2016 a two day Seminar was organized by Nirmala College of Pharmacy, Muvattupuzha on "Pharmaceutical education in professional perspective was attended by Mrs.Lincy George, Mrs. Rosmin Jacob, Dr. Alfet Raju Anthraper and students of department of pharmacy practice.

4. Mr. Leo Mathew, Mrs.Meppil Baby and students of department of pharmacy practice attended a two day seminar on "The responsible pharmacist-transforming patient care" conducted by Indian Association of Colleges of Pharmacy, Chennai at Le Meridien, Coimbatore on 2nd & 3rd April 2016.

5. Dr. K. Krishnakumar and Dr.L.Panayappan delivered a talk on "Review on drug action and how to start a retail pharmacy" at Cherraan's College of Pharmacy, Coimbatore on 28th & 29th April 2016.

PUBLICATIONS

1. Stephy Maria John, K.Krishnakumar, L. Panayappan, Lincy George, Nosocomial Stenotrophomonas Maltophilia Infections, International Journal Of Research In Biomedicine And Biotechnology, 2015; August 5 (1):1-3

2. Keerthy Ranganadhan, K. Krishnakumar , K. Jayapraksah, L. Panayappan. Spinal Cord Stimulation: A Dominant Therapy For Refractory Angina Pectoris, International Research Journal Of Pharmacy, August 2015; 6 (8)

3. Happy Thomas, K.Krishnakumar, L Panayappan, Lincy George. Mesenchymal Stem Cell Therapy: A Strategy For Cartilage Repair In Osteoarthritis, International Journal Of Pharmaceutical And Clinical Science, 2015; 4 August 5 (2): 13-16.

4. L.Panayappan, Ruksana VS, Lincy George, K. Krishnakumar. Prospective Study On Diabetes Related Quality Of Life And Impact Of Pharmaceutical Care. International Journal Of Pharmacy And Biological Sciences (IJPBS). Accepted 6th May-2016.

5. L. Panayappan, Faseela PS, Lincy George, K. Krishnakumar. An Assessment And Evaluation Of Patient Compliance In Type II Diabetes Mellitus In General Medicine Department Of Tertiary Care Hospital. International Journal of Pharmacy. Accepted 6th May-2016.

6. Anu Jayson, L. Panayappan, K. Krishnakumar, Leo Mathew. Organophosphate Induced Neurotoxicity – A Review. Current Research in Medicine and Medical Sciences. Accepted 23rd May-2016.

7. Avani M.S, K. Krishnakumar, L. Panayappan, Lincy George. Use Of Insulin Sensitizers In The Treatment Of Adolescents With Polycystic Ovarian Syndrome. International Journal of Current Pharmaceutical and Clinical Research. Accepted 23rd May-2016.

8. Dawn VJ, K. Krishnakumar, L. Panayappan. Abuse of Over-The-Counter Medicines – An Overview. International Journal of Pharmacy Practice and Drug Research. Accepted 23rd May-2016.

9. Madhuri Menon, K.Krishnakumar, L .Panayappan, Lincy George.Drug Therapy Approach on Diabetic Nephropathy - A 4 Review. International Journal of Pharmacology Research. Vol 6, Issue 3, 2016.

10. Lisha Shaju, L.Panayappan, K. Krishnakumar, Rosmin Jacob.Clinical Outcomes of Polypharmacy in Geriatric Patients. International Journal of Pharmacotherapy. Vol.6 (3), 2016.

11. Jensa John V, L. Panayappan, K. Krishnakumar, Leo Mathew.Disposal Of Unused Medicines -A Review. International Journal of Innovative Drug Discovery. Vol 6, Issue 3, 2016.

12. Irfana PY, L.Panayappan, K.Krishnakumar, Lincy George .Management Of Urinary Tract Infection and Diabetes- a Review. International Journal of Biological & Pharmaceutical Research. 7(6),2016.

13. Gloria George, L.Panayappan, K.Krishnakumar, and K.Jayaprakash.Hypertension In Pregnancy: Current Pharmacologic Treatment: A Review. International Journal of Preclinical & Pharmaceutical Research. 6(3),2016.

14. Foicy Paul. K, K.Krishnakumar, Rosmin Jacob, K. Jayapraksah, and L.Panayappan.Barriers And Non-Compliances in Elderly Diabetic Patients: A Review. Health Sciences: An International Journal.2016.

15. Dawn VJ. K. Krishnakumar, K. Jayaprakash, L. Panayappan.Zika Virus Infection-A Review. International Journal of Pharmacotherapy. 6(3), 2016.

FDA BANNED DRUGS

SL.NO	DRUG	INDICATION	ALERT	DATE
1	Cough Syrup Corex	Antitussive	Addiction	15.03.2016
2	Drug Tribet	Antidiabetic	Aneamia,altered sense of taste	15.03.2016
3	Cream Panderm plus	Antibiotic	Itching,skin redness,Skin peeling	15.03.2016
4	Tab.Sumo	Analgesic and anti-pyretic	Abdominal discomfort,Dizziness	15.03.2016
5	Tab.Taxim AZ	Antibiotic	Diarrhea and non-allergic skin rash	15.03.2016
6	Tab. Gemer P	Antidiabetic	Sore throat,Weight gain,Pink or red urine	15.03.2016
7	Tab. Zerodol P	Treatment of pain and inflammation	Abdominal discomfort,heart burn,rash	15.03.2016
8	Tab.Vicks Action 500 Extra	Cold	Seizures Mental/mood changes	15.03.2016
9	Tab.Triexer	Anti-diabetic drugs	Gastrointestinal disturbanc-es, nausea, skin reactions vomiting	15.03.2016
10	Tab.Gluconorm	Treatment of Type 2 Diabetes	Hypoglycemia	15.03.2016
11	Tab.Ace Proxyvon	Analgesics	Acute renal tubular necrosis.	15.03.2016
12	Zedex cough syrup	Dry mouth	Skin rashes, difficulty in urination	15.03.2016
13	Ascoril cough syrup	Dry cough	Nausea stomach upset skin rash acute toxicity	15.03.2016

FDA APPROVED DRUG LIST

SL.NO	Drug Name	Active Ingredient	Approval Date	FDA-approved use on approval date
1	Netspot	Gallium Ga 68 dotatate	01.06.2016	A diagnostic imaging agent to detect rare neuroendocrine tumors
2	Axumin	Fluciclovine F18	27.05.2016	A diagnostic imaging agent to detect recurrent prostate cancer
3	Ocaliva	Obeticholic acid	27.05.2016	To treat rare choronic liver disease
4.	Zinbryta	Daclizumab	27.05.2016	To treat multiple sclerosis
5	Tecentriq	Atezolizumab	18/05/2016	To treat urothelial carcinoma, the most common type of bladder cancer
6	Nuplazid	Pimavanserin	29/04/2016	To treat hallucinations and delusions associated with psychosis experienced by some people with Parkinson's disease
7	Venclexta	Venetoclax	11/04/2016	For chronic lymphocytic leukemia in patients with a specific chromosomal abnormality
8	Defitelio	Defibrotide sodium	30/03/3016	To treat adults and children who develop hepatic veno-occlusive disease with additional kidney or lung abnormalities after they receive a stem cell transplant from blood or bone marrow called hematopoietic stem cell transplantation
9	Cinqair	Reslizumab	23/03/2016	To treat severe asthma
10	Taltz	Ixekizumab	22/03/2016	To treat adults with moderate-to-severe plaque psoriasis.
11	Anthim	Obiltoxaximab	18/03/2016	To treat inhalational anthrax in combination with appropriate antibacterial drugs.
12	Briviact	Brivaracetam	18/02/2016	To treat partial onset seizures in patients age 16 years and older with epilepsy.
13	Zepatier	Elbasvir and Grazoprevir	28/01/2016	To treat patients with chronic hepatitis C virus (HCV) genotypes 1 and 4 infections in adult patients.

DRUG PROFILE

PIMAVANSERIN

Date of Approval: 29.04.2016
Brand: NUPLAZID

Indication: Atypical antipsychotic indicated for the treatment of hallucinations and delusions associated with Parkinson's disease.

Dose: Recommended dose is 34 mg, taken orally as two 17 mg tablets once daily, Can be taken with or without food.

Mechanism of Action: The mechanism of action of pimavanserin in the treatment of hallucinations and delusions associated with Parkinson's disease psychosis is unknown. However, the effect of pimavanserin could be mediated through a combination of inverse agonist and antagonist activity at serotonin 5-HT2A receptors and to a lesser extent at serotonin 5-HT2C receptors.

Pharmacokinetics:
Absorption
The median Tmax of pimavanserin was 6 (range 4-24) hours and was generally unaffected by dose. The bioavailability of pimavanserin oral tablet and pimavanserin solution was essentially identical. The formation of the major circulating N-desmethylated metabolite AC-279 (active) from pimavanserin occurs with a median Tmax of 6 hours.
Ingestion of a high-fat meal had no significant effect on rate (Cmax) and extent (AUC) of pimavanserin exposure. Cmax decreased by about 9% while AUC increased by about 8% with a high-fat meal.

Distribution
Pimavanserin is highly protein bound (~95%) in human plasma. Protein binding appeared to be dose-independent and did not change significantly over dosing time from Day 1 to Day 14. Following administration of a single dose of Pimavanserin (34 mg), the mean (SD) apparent volume of distribution was 2173 (307) L.
Elimination Metabolism
Pimavanserin is predominantly metabolized by CYP3A4 and CYP3A5 and to a lesser extent by CYP2J2, CYP2D6, and various other CYP and FMO enzymes. CYP3A4 is the major enzyme responsible for the formation of its major active metabolite (AC-279). Pimavanserin does not cause clinically significant CYP inhibition or induction of CYP3A4. Based on in vitro data, pimavanserin is not an irreversible inhibitor of any of the major hepatic and intestinal human CYP enzymes involved in drug metabolism (CYP1A2, 2B6, 2C8, 2C9, 2C19, 2D6, and 3A4). Based on in vitro studies, transporters play no significant role in the disposition of pimavanserin.
AC-279 is neither a reversible nor irreversible (metabolism-dependent) inhibitor of any of the major hepatic and intestinal human CYP enzymes involved in drug metabolism (CYP1A2, 2B6, 2C8, 2C9, 2C19, 2D6, and 3A4). AC-279 does not cause clinically significant CYP3A induction and is not predicted to cause induction of any other CYP enzymes involved in drug metabolism.

Excretion

Approximately 0.55% of the 34 mg oral dose of C-pimavanserin was eliminated as unchanged drug in urine and 1.53% was eliminated in feces after 10 days. Less than 1% of the administered dose of pimavanserin and its active metabolite AC-279 were recovered in urine.

Adverse Effects:

• Increased Mortality in Elderly Patients with Dementia-Related Psychosis:
Antipsychotic drugs increase the all-cause risk of death in elderly patients with dementia-related psychosis. Although the causes of death were varied, most of the deaths appeared to be either cardiovascular (e.g., heart failure, sudden death) or infectious (e.g., pneumonia) in nature.

• **QT Interval Prolongation**

Pimavanserin prolongs the QT interval. The use of pimavanserin should be avoided in patients with known QT prolongation or in combination with other drugs known to prolong QT interval including Class 1A antiarrhythmics (e.g., quinidine, procainamide) or Class 3 antiarrhythmics (e.g., amiodarone, sotalol), certain antipsychotic medications (e.g., ziprasidone, chlorpromazine, thioridazine), and certain antibiotics (e.g., gatifloxacin, moxifloxacin). Pimavanserin should also be avoided in patients with a history of cardiac arrhythmias, as well as other circumstances that may increase the risk of the occurrence of sudden death, including symptomatic bradycardia, hypokalemia or hypomagnesemia, and the presence of congenital prolongation of the QT interval.

Drug Interactions

QT Interval Prolongation	
Clinical Impact:	Concomitant use of pimavanserin drugs that prolong the QT interval may add to the QT effects of and increase the risk of cardiac arrhythmia.
Intervention:	Avoid the use of pimavanserin in combination with other drugs known to prolong QT interval.
Examples:	Class 1A antiarrhythmics: quinidine, procainamide, disopyramide; Class 3 antiarrhythmics: amiodarone, sotalol; Antipsychotics: ziprasidone, chlorpromazine, thioridazine; Antibiotics: gatifloxacin, moxifloxacin
Strong CYP3A4 Inhibitors	
Clinical Impact:	Concomitant use of pimavanserin with a strong CYP3A4 inhibitor increases pimavanserin exposure.
Intervention:	If pimavanserin is used with a strong CYP3A4 inhibitor, reduce the dosage of pimavanserin.
Examples:	itraconazole, ketoconazole, clarithromycin, indinavir
Strong CYP3A4 Inducers	
Clinical Impact:	Concomitant use of a strong CYP3A4 inducer may reduce pimavanserin exposure resulting in a potential decrease in efficacy.
Intervention:	Patients should be monitored for reduced efficacy and an increase in dosage may be needed if pimavanserin is used concomitantly with strong CYP3A4 inducers.
Examples:	rifampin, carbamazepine, phenytoin, St. John's wort.

Pregnancy & Lactation:

There are no data on pimavanserin use in pregnant women that would allow assessment of the drug-associated risk of major congenital malformations or miscarriage. There is no information regarding the presence of pimavanserin in human milk, the effects on the breastfed infant, or the effects on milk production.

Pediatric use:

Safety and effectiveness of pimavanserin have not been established in pediatric patients.

Geriatric use:

No dose adjustment is required for elderly patients.

Renal Impairment

No dosage adjustment for pimavanserin is needed in patients with mild to moderate (CrCL ≥30 mL/min, Cockcroft-Gault) renal impairment.

Hepatic Impairment

Use of pimavanserin is not recommended in patients with hepatic impairment.

Other Specific Populations

No dosage adjustment is required based on patient's age, sex, ethnicity, or weight. These factors do not affect the pharmacokinetics of Pimavanserin.

Contraindications: None

Cancer immunotherapy

Cancer immunotherapy is the use of the immune system to treat cancer. These approaches exploit the fact that cancer cells often have molecules on their surface that can be detected by the immune system, known as tumour-associated antigens (TAAs); they are often proteins or other macromolecules (e.g. carbohydrates). It is already used in many cancer treatments, but it tends to be a second-line approach or reserved for advanced disease. In 2016, we'll see more immunotherapy treatments approved and they will likely become the first-line choice in many cancers.

Recently, the American Association for Cancer Research convened an international immunotherapy conference, which completely sold out. One of the biggest stories to emerge was how chemotherapy resistance can be overcome using engineered proteins. Resistance is an all-too-common problem that dampens the hopes of precision medicine. These proteins, which are smaller than antibodies, will bring immunotherapy to new levels in 2016.

New drug combinations, combining traditional chemotherapy with immunotherapy, will also blossom in 2016. Such approaches are already showing promise in lung cancer, prostate cancer and melanoma. And we can expect new vaccines against cancer to emerge in 2016.

What is cancer immunotherapy?

Immunotherapies can be categorized as active, passive or hybrid (active and passive).

Active immunotherapy directs the immune system to attack tumor cells by targeting TAAs. Passive immunotherapies enhance existing anti-tumor responses and include the use of monoclonal antibodies, lymphocytes and cytokines.

Active cellular therapies usually involve the removal of immune cells from the blood or from a tumor. Those specific for the tumor are cultured and returned to the patient where they attack the tumor.

Interleukin-2 and interferon-α are cytokines, proteins that regulate and coordinate the behaviour of the immune system. They have the ability to enhance anti-tumor activity and thus can be used as passive cancer treatments.

Immune Checkpoint Inhibitors: Enhancing the Immune Response to Cancer

An overactive immune system can lead to excessive inflammation and development of autoimmune disorders. The body uses molecules known as immune checkpoints to control the strength and duration of immune responses, minimizing damage to healthy tissue. Some tumors produce these same molecules and thereby suppress the immune response to the tumor.

Immune checkpoint inhibitors release these tumor-induced brakes on the immune system, unleashing it to attack malignant tumors and stop their growth. These treatments are showing promising results in many types of cancer, including melanoma and lung cancer.

Immune checkpoints affect immune system functioning. Immune checkpoints can be stimulatory or inhibitory.

Tumors can use these checkpoints to protect themselves from immune system attacks. Checkpoint therapy can block inhibitory checkpoints, restoring immune system function. One ligand-receptor interaction under investigation is the interaction between the transmembrane programmed cell death 1 protein (PDCD1, PD-1; also known as CD279) and its ligand, PD-1 ligand 1 (PD-L1, CD274). PD-L1 on the cell surface binds to PD1 on an immune cell surface, which inhibits immune cell activity. Among PD-L1 functions is a key regulatory role on T cell activities. It appears that (cancer-mediated) upregulation of PD-L1 on the cell surface may inhibit T cells that might otherwise attack. Antibodies that bind to either PD-1 or PD-L1 and therefore block the interaction may allow the T-cells to attack the tumor.

The first FDA-approved immune checkpoint inhibitor, ipilimumab, blocks the CTLA-4 molecule on T cells, which leads to a broad enhancement of immune responses, including attacks on cancer cells. A range of newer drugs targets a different immune checkpoint protein known as PD-1. Those treatments work by preventing cancer cells from attaching to the PD-1 protein on immune cells, which leads to an increased antitumor immune response and generally fewer adverse effects.

The US Food and Drug Administration (FDA) has approved atezolizumab, in May 2016 as the first cancer immunotherapy that acts as a programmed cell death ligand inhibitor (PD-L1), for the treatment of urothelial carcinoma, the most common type of bladder cancer.

Broadening the Possibilities for Checkpoint Inhibitors

The past year brought early reports suggesting that immune checkpoint inhibitors targeting PD-1 and PD-L1 are effective across a range of different cancer types, beyond melanoma and lung cancer. A particularly encouraging finding was that immunotherapy was effective against many tumors that were resistant to traditional treatments.

Cellular immunotherapy, Antibody therapy (Alemtuzumab, Ipilimumab, Nivolumab, Ofatumumab, Pembrolizumab, Rituximab), Cytokine therapy (Interferon, Interleukin), Anti-CD47 antibodies, Polysaccharides, Neoantigens etc are the methods used under this.

One major advantage of these immuno-oncology drugs is that they replace approach of chemotherapy with a more refined and individualized mechanism that can guide the body's immune cells, or T-cells, to specifically target and destroy cancerous cells.

The biggest implication of the discovery is that it may allow for completely personalized therapies and elicit significantly higher response rates in patients compared with current immunotherapies.

Biopharma companies are likely to continue pumping massive R&D resources into immunotherapies,

which involve extracting patients' immune cells and reengineering them to target cancers. However, this method has mostly shown promise in blood cancers, rather than solid tumors.

From the first astounding successes in advanced melanoma, there is now evidence that immunotherapy works against a range of cancers. Even for patients who have exhausted all traditional treatments, immunotherapy is able to halt cancer growth, often with only mild adverse effects.

Determining clinical efficacy can be challenging because of pseudoprogression and other distinct immune-related patterns of response that have been observed with these therapies.

The WHO have traditionally provided standard guidelines for defining tumor response to therapy, However, the phenomenon of pseudoprogression, which can involve a temporary increase in tumor size and the development of new lesions, could be prematurely diagnosed as progressive disease with WHO criteria.

Immunotherapy tends to be a second-line approch for advanced diseases. Cancer immunotherapy aid cancer antigen targeting. The use of immunotherapy is increasing in cancer care, but more research is needed to measure the effectiveness of treatment.

CONGRATULATIONS

St-James College of Pharmaceutical Sciences, Chalakudy, Secured overall championship in Pharmolsavam 2016 conducted by Kerala State Self - financing Pharmacy College Managements Association (KSSPCMA) at Prime College of Pharmacy, Palakkad on March 17th, 18th and 19th.

We Acknowledge: *The doctors of St. James' Hospital & The Doctors of Taluk head quarters Hospital, Chalakudy for their interaction with the students during ward rounds and queries directed to our Drug Information Centre which in-turn help us to train the students. Their constant support keeps us growing.*

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