23 نوفمبر 2022

السيد الأستاذ الدكتور/ وكيل الكلية لشئون الطلاب

تحية طيبة وبعد،،،

نحيط سيادتكم علما بأن القائمين على تدريس مقرر الصيدلة الإشعاعية (مقرر اختياري - الفرقة الرابعة قديم) بقسم الصيدلانيات سوف يقومون باستضافة متحدثين guest speakers لإلقاء محاضرات عن التطبيق الإكلينيكي للمستحضرات المشعة ومجال الصيدلة الإشعاعية المهني على طلاب الفرقة الرابعة من دراسي المقرر، وسيكون هذا على النحو التالي:

-يوم الاثنين الموافق 28 نوفمبر 2022 **د. وليد محمد أحمد دياب**-الأستاذ المساعد بقسم علاج الأورام والطب النووي، وذلك في الساعة الثانية عشر مساءا في مدرج القسم وفي موعد الحصة العملية للمقرر.

-يوم الاثنين الموافق 5 ديسمبر 2022، **أ.د. تامر صقر** أستاذ الكيمياء الصيدلية بهيئة الطاقة الذرية المصرية ، حيث يلقي المحاضرة "أونلاين" على الطلاب وذلك في فصل 1 بالدور الخامس بمبنى أ (حيث أنه مجهز للاتصال بالأنترنت) وذلك في الساعة الثانية ظهرا ، وبرجاء التكرم باتخاذ اللازم نحو حجز فصل 1 في الموعد المذكور.

وتفضلوا سيادتكم بقبول و افر الاحترام والتقدير،،،

د. سارة أحمد أبو المجد

أستاذ مساعد بقسم الصيدلانيات

(عن القائمين على تدريس المقرر)

أنشطة طلابية في مقرر الصيدلة الأشعاعية

تحت اشراف منسقي مقررصيدلة إشعاعية:

- أنه في يوم الأثنين الموافق٢٨ نوفمبر ٢٠٢٢ تم استضافة د.وليد محمد أحمد دياب – الأستاذ المساعد بقسم علاج الأورام و الطب النووي لإلقاء ندوة علمية عن "التطبيقات الطبية للإشعاع." في مدرج قسم الصيدلانيات وقد شهد تفاعل طلاب مقررصيدلة اشعاعية بالحضور و تبادل المناقشة مع المحاضرعقب إلقاء المحاضرة.

- كما تم في يوم الأثنين الموافق ٥ ديسمبر ٢٠٢٢ إجراء محاضرة (أونلاين) عبر برنامج Microsoft teams مع أ.د.تامر صقر أستاذ الكيمياء الصيدلية بهيئة الطاقة الذرية المصرية

تحت عنوان: "مقدمة عن مجال الصيدلة الإشعاعية " بحضور طلاب المقرر في قاعة قسم الصيدلة الأكلينيكية-مبنى أ، كما شارك بالمحاضرة عدد من طلاب الفرق الأخرى.

كلية الصيدلة
جامعة أسيوط

يدعوكم قسم الصيدلانيات
بالاشتراك مع وحدة الطب
النووي بكلية الطب لحضور
محاضرة يلقيها:

INTRODUCTION TO RADIOPHARMACY FIELD

مقدمة عن مجال الصيدلة الإشعاعية

أ.د. تامر صقر

أستاذ الكيمياء الصيدلية
الاشعاعية - هيئة الطاقة الذرية
خبير الوكالة الدولية للطاقة
الذرية في مجال النظائر
والمستحضرات الصيدلانية
المشعة

questions: sabouelm@aun.edu.eg

12
ديسمبر
2022

الساعة الثانية ظهرا

عبر برنامج
MICROSOFT TEAMS
MEETING ID: 386 051 742 519
Password: HcE9zg

محاضرة أونلاين
يتم عرضها في قاعة 1 -
مبنى أ - الدور الخامس


TACHI

Activity required

What are you required to do?

Design and submit an infographic on a Radiopharmacy topic

How many marks are on this task?

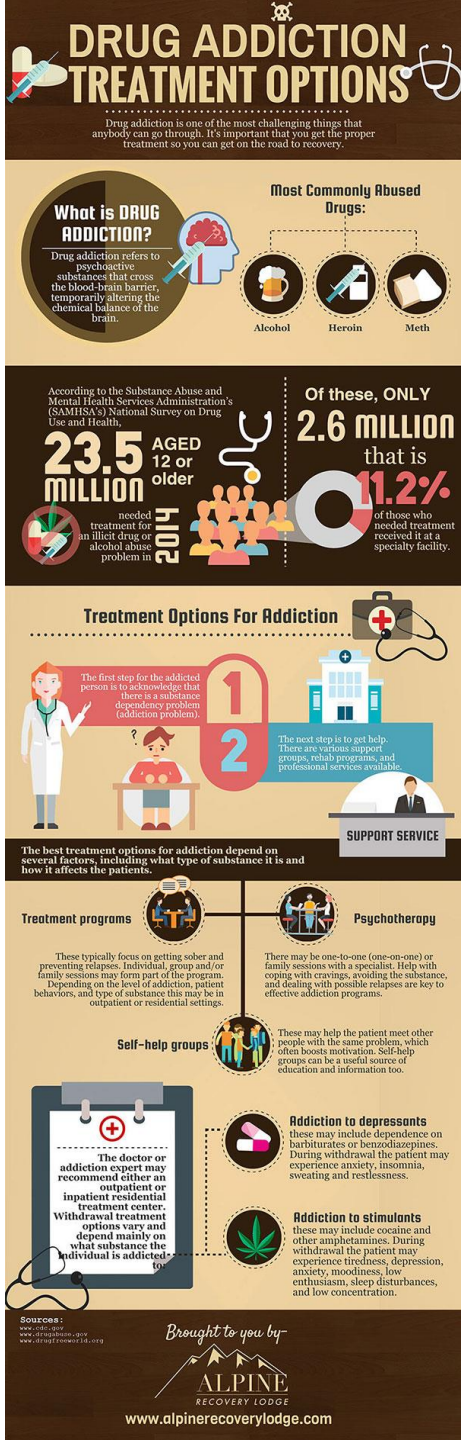
4 marks

What is the deadline for the submission?

December 5th – 9 pm

What is an infographic ?

Infographics are graphic visual representations of information, data, or knowledge intended to present information quickly and clearly.



Comprehensive Medication Management (CMM)

Improving Care of High-Risk Patients

CMM is a team-based care process to ensure high-risk patients receive the best and safest results from medication therapy according to treatment guidelines and scientific evidence.

WHAT?

HOW?

1. **IDENTIFY** Patient with chronic disease(s) at high-risk for poor health outcomes (hospitalization, death, complication of disease) is identified. Treatment goals are established by patient/provider.

2. **REFER** Patient is referred to pharmacist-led team with expertise in delivering CMM for evaluation of medication-related barriers and opportunities to control disease.

3. **COLLABORATE** Pharmacist works with patient and physician through a formal agreement (collaborative practice agreement) to assist patient in reaching treatment goals.

4. **MONITOR** Patient progress is continually monitored to ensure safety and effectiveness of drug therapy, and team reports to provider.

5. **IMPACT** Patient continues to work with pharmacist. Medication adjustments are made as needed until patient reaches treatment goals.

CMM PROTECTING PATIENTS

MEDICATIONS MATTER

WHY?

Adverse effects from medications are estimated to be the **4th** leading cause of DEATH in the U.S.[1]

$290 BILLION of avoidable spending annually is due to MISUSE of medications[2].

75% of hospital readmissions among seniors in the U.S. are avoidable, primarily through better use of medications[3].

50% — **1/2** of the prescription medications taken every year in the US are used improperly[4].

Approximately **10 people** in the U.S. **DIE EVERY HOUR** from preventable medication harms

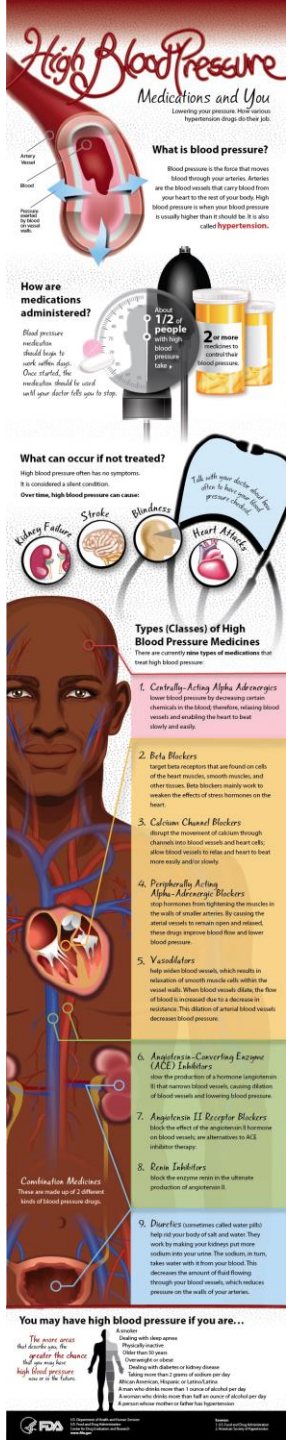
WHAT can I do next to start benefitting from CMM?

Healthcare professionals:
For more information, go to: pharmweb.usc.edu/MedicationManagement to include a one-stop-shop for CMM resources

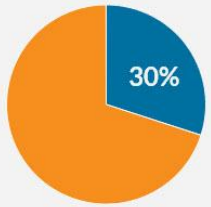
High-Risk Patients:
Talk to your physician and ask for CMM

CDPH California Department of PublicHealth

USC School of Pharmacy



Pharmaceutical Supply Chain



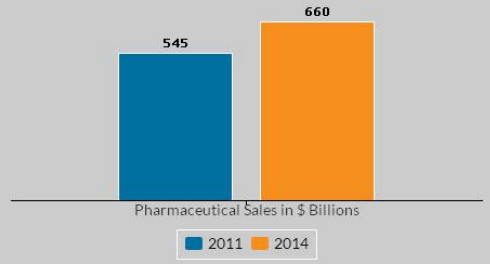
Omni channel

As of 2012, 30% of all drugs purchased globally by hospitals & pharmacies were bought directly from the pharmaceutical manufacturer rather than through wholesalers/distributors. This has continued to grow with the popularity of cross channel sales.

Expansion into Emerging Markets

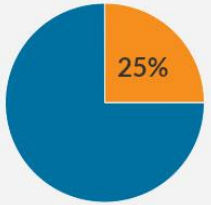
Improving access to customers in emerging markets is providing pharmaceutical companies with opportunities for growth.

$$$$



Supply Chain Costs

Supply chain expenses = 25% of pharmaceutical costs



$1 trillion Global pharma industry expected to be worth more than $1 trillion by 2014

$$ 250 billion of that = annual supply chain costs

Technology Improvement

Warehouse Management Systems (WMS) are being implemented to increase efficiency and reduce cost.

Increase profits by removing wholesalers from the supply chain

▼

Implement an efficient omni channel strategy by integrating all technology platforms

WMS will manage activity increases when expanding business into emerging markets

Implementing a robust WMS will assist in streamlining supply chain operations

Source: www.strategy-business.com "Five Steps toward a Revitalized Pharmaceutical Supply Chain"; McKinsey & Company "Building New Strengths in the Healthcare Supply Chain" ; www.reportlinker.com "Pharmaceutical Industry Market Research & Statistics"

datex

The diabetes dilemma

Comorbidities and **complications** make diabetes a difficult, costly challenge that can only be controlled with a high standard of clinical care.

Care

Not one-size-fits-all

Diabetes is a common disease, **affecting nearly 30 million Americans**[1], but every individual requires personal attention and care for better outcomes.

36.6% of diabetes patients are nonadherent to diabetes medications[2]

Comorbidities

Patients with diabetes often have related conditions that present additional health challenges.

High blood pressure

High cholesterol

87% have one or both

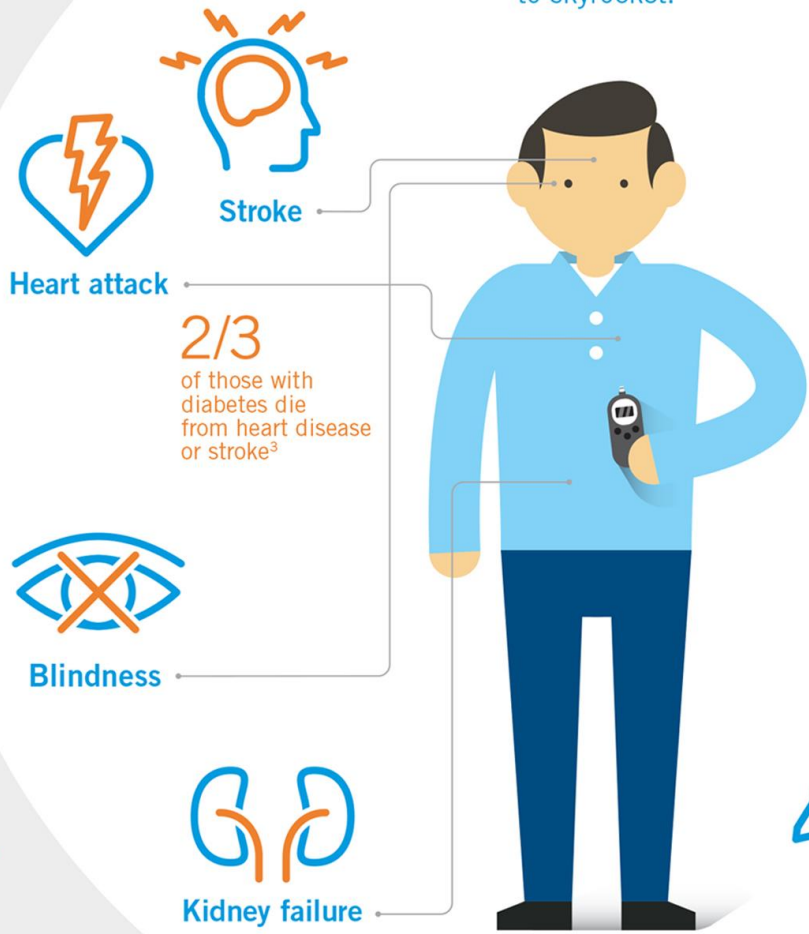
Depression

25% are prescribed an antidepressant

30 vs. 90

Only 48.3% of patients with 30-day fills at retail are adherent to oral diabetes drugs vs. 67.7% (90-day retail) and 81.4% (90-day home delivery).[5]

Adherence is critical.
Patients with diabetes are at increased risk for developing serious complications, while healthcare costs continue to skyrocket.



Cost

#1 **costliest** traditional therapy class over the past 6 years[2]

$176B in diabetes-related medical costs in the U.S.[1]

20% Diabetes trend will be near 20% for each of the next three years[2]

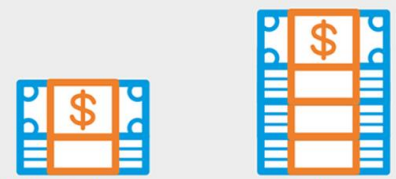
High and climbing

84 million adults – or 1 in 3 – have prediabetes.[3]

With prevalence on the rise, it's inevitable that more and **more of your member population will need treatment** in the future.

Increased plan costs

Plan costs are nearly **three times more** for patients with diabetes than for those without diabetes.[5]



Recomendaciones sobre la amalgama dental

U.S. FOOD & DRUG ADMINISTRATION

La amalgama dental, a veces llamada "relleno de plata", es una mezcla de mercurio, plata, cobre, estaño y zinc que se utiliza para rellenar las caries en los dientes. Los rellenos de amalgama dental liberan pequeñas cantidades de mercurio en forma de vapor (gas) que pueden entrar al cuerpo por inhalación.

QUÉ

Poblaciones de alto riesgo

Niños, especialmente los menores de seis años

Mujeres embarazadas o que planean quedar embarazadas

Madres lactantes

Personas con deficiencias neurológicas o problemas de riñones

Personas sensibles al mercurio, la plata, el cobre, el estaño o el zinc

QUIÉN

Aunque no se conocen riesgos para la salud asociados con la ingestión de partículas pequeñas de amalgama dental, la inhalación de vapores de mercurio puede ser dañina para ciertos grupos de personas.

La Administración de Alimentos y Medicamentos de los E.E.U.U. (FDA, por sus siglas en inglés) recomienda que las poblaciones de alto riesgo eviten que se les coloquen las amalgamas dentales, si es posible y apropiado.

- Si su relleno está en buenas condiciones, la FDA recomienda que **no le remuevan** el relleno de amalgama dental, a menos que sea médicamente necesario.
- Si pertenece a una población de alto riesgo hable con su proveedor de servicios dentales sobre otras opciones de tratamiento disponibles.

POR QUÉ

Para obtener más información, visite **www.fda.gov/dental-amalgam**.

U.S. Food and Drug Administration

Drug Approval Process

What is a drug as defined by the FDA?

A drug is any product that is intended for use in the diagnosis, cure mitigation, treatment , or prevention of disease; and that tis intended to affect the structure or any function of the body.

PRE-CLINICAL

Drug Sponsor's Discovery and Screening Phase

Drug Developed

Drug sponsor develops a new drug compound and seeks to have it approved by FDA for sale in the United States.

1

Animals Tested

Sponsor must test new drug on animals for toxicity. Multiple species are used to gather basic information on the safety and efficacy of the compound being investigated/researched.

2

IND Application

The sponsor submits an Investigational New Drug (IND) application to FDA based on the results from intial testing that include, the drug's composition and manufacturing, and develops a plan for testing the drug on humans.

IND REVIEW

FDA reviews the IND to assure that the proposed studies, generally referred to as clinical trials, do not place human subjects at unreasonable risk of harm. FDA also verifies that there are adequate informed consent and human subject protections.

FDA's Center for Drug Evaluation and Research (CDER) evaluates new drugs before they can be sold.

The center's evaluation not only prevents quackery, but also provides doctors and patients the information they need to use medicines wisely. CDER ensures that drugs, both brand-name and generic, are effective and their health benefits outweigh their known risks.

CLINICAL

Drug Sponsor's Clinical Studies/Trials

3

PHASE 1

20-80

The typical number of healthy volunteers used in Phase 1; this phase emphasizes safety. The goal here in this phase is to determine what the drug's most frequent side effects are and, often, how the drug is metabolized and excreted.

4

PHASE 2

100's

The typical number of patients used in Phase 2; this phase emphasizes effectiveness. This goal is to obtain preliminary data on whether the drug works in people who have a certain disease or condition. For controlled trials, patients receiving the drug are compared with similar patients receiving a different treatment--usually a placebo, or a different drug. Safety continues to be evaluated, and short-term side effects are studied.

At the end of Phase 2, FDA and sponsors discuss how large-scale studies in Phase 3 will be done.

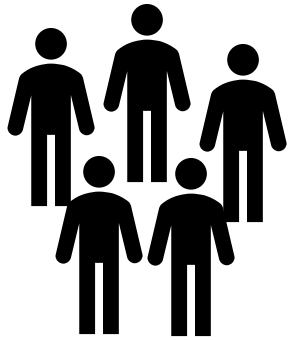
5

PHASE 3

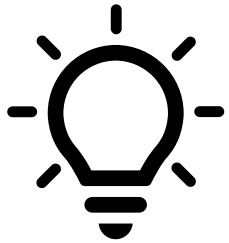
1000's

The typical number of patients used in Phase 3. These studies gather more information about safety and effectiveness, study different populations and different dosages, and uses the drug in combination with other drugs.

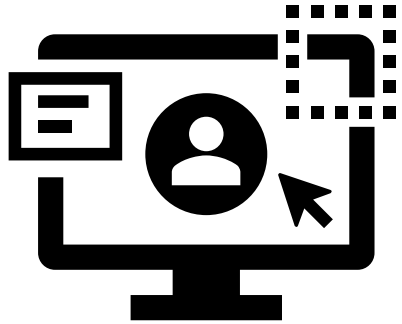
Next lab



Groups of 2-4



Choose or propose topic



Determine the points the infographic will include, collect info and design

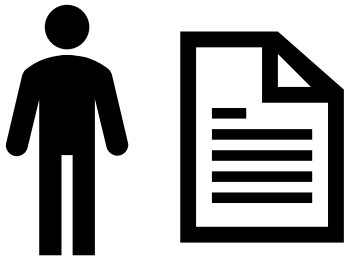
Canva.com

Visme.co

Photoshop

Power point

Long before deadline



Revise your infographic with the TA

By deadline: December 5th

Submit your infographic by email
sabouelm@aun.edu.eg
E-mail subject: Infographic- Lab#
In your email:
Topic name – group members

December 12th

Bring printed infographic to the lab

Best 1 or 2 infographics will be recognized

Notes

Infographic should be:

- **Original (not copied)**
- **Covers different points of the topic**
- **Balances text/info and graphics**
- **References should be provided with the infographic**

If infographic is copied= zero marks
Submission after deadline = zero marks

Students’ Infographics

أحمد عامر مهدي

اسراء أشرف محمود

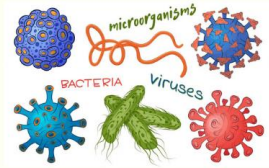
Imaging of inflammation and infection

IMAGING OF INFECTION HAS A VITAL ROLE BOTH IN THE INITIAL DIAGNOSIS AND IN THE CONTINUING MANAGEMENT OF PATIENTS WITH INFECTION OR SUSPECTED INFECTION

1

Types of inflammation
- Acute
- Chronic

Types of infection
- Viral
- Bacterial
- Fungal

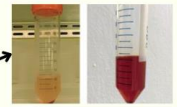


2

Properties of ideal imaging agents :
- No side effects
- Specific
- Safe and easy to prepare
- Applicable to immunocompromised pateints

3

Radiopharmaceuticals used :
- radiolabel leukocytes
- 18F-FDG
- 67Ga-citrate labeled antigranulocyte antibody preparations

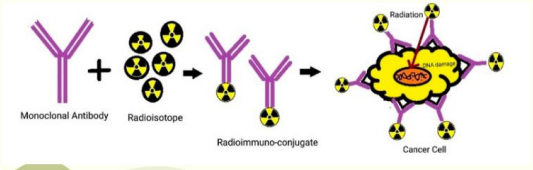


4

Imaging Techniques used :
- CT scan
- MRI ultrasound
- SPECT
- PET
- X-Ray

أسماء نبيل عبد اللاه

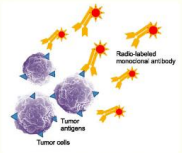
Radioimmunotherapy(RIT)



1

What is Radioimmunotherapy

RIT is a combination of radiation therapy + immunotherapy



2

Use of Radiommunotherapy

treat non-Hodgkin B-cell lymphoma

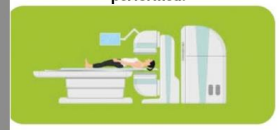
for newly diagnosed patients

patients have not responded to chemotherapy or treatment with monoclonal antibody

3

What Equipment is used?

start and maintain intravenous catheter, images of patient with gamma camera before or after therapy. Often, single photon emission cumbuted tomography (SPECT) imaging will also be performed.



4

What will you feel during procedure?

Except for intravenous injections, most nuclear medicine procedures are painless

5

Side effects

decrease in blood counts. this lowering of blood counts may result in bleeding or infection. There is a small risk of bone marrow damage.

Fever

Allergy Symptoms

Additional side effects , which are usually short-term

Rash

Diarrhea

CHILLS

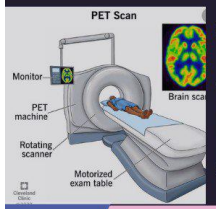
Positron emission tomography (PET/CT)

What is PET/CT scanning?

is a type of nuclear medicine imaging. uses small amounts of radioactive materials called radiotracers or radiopharmaceuticals, a special camera and a computer to evaluate organ and tissue functions. By identifying changes at the cellular level, PET may detect the early onset of disease before other imaging tests can.

Some common uses of the procedure:-

- detect cancer and/or make a diagnosis.
- determine whether a cancer has spread in the body.
- assess the effectiveness of treatment.
- evaluate brain abnormalities, such as tumors, memory disorders, seizures and other central nervous system disorders.
- map normal human brain and heart function.



What does the equipment look like?

A PET scanner is a large machine with a round, donut-shaped hole in the middle. It looks like a CT or MRI unit. Multiple rings of detectors inside the machine record the energy emissions from the radiotracer in your body.

The limitations of PET/CT

- It can take several hours to days for the radiotracer to accumulate in the area of interest
- Altered blood sugar or blood insulin levels may adversely affect the test results of diabetic patients or patients who have eaten a few hours prior to the exam.

Want to Learn More?

https://www.radiologyinfo.org/en/info/pet

أميرة عادل ابراهيم

Radiation Toxicity

What is radiation toxicity?

Exposure to very high levels of radiation, such as being close to an atomic blast

Hazards of radiation

- Skin burn
- Nausea
- Vomiting
- Death

How can you protect yourself from radiation?

Time

less time spent near the source less radiation received

Distance

great distance from the source less radiation received

Shield

behind sheilding from source less radiation received

اميرة محمود حسن

ايريني نجار

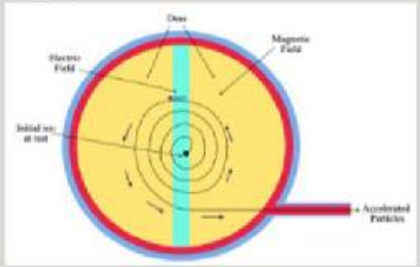
Production of Radionuclides in Reactors

The radionuclides used to make radiopharmaceuticals are produced artificially

Via devices

Cyclotron:

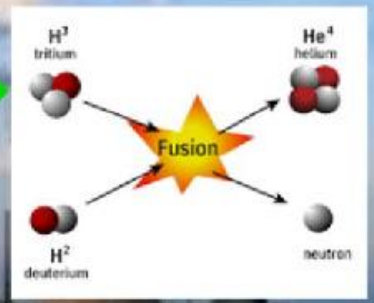
accelerator propels a beam of charged particles (protons) in a circular path.

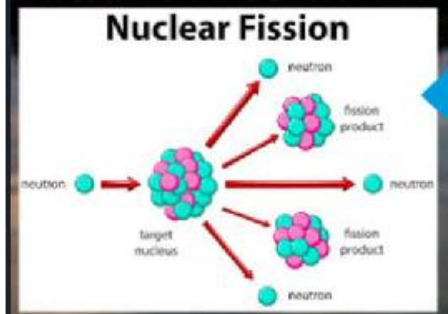


Via processes

Nuclear Fusion 1

two or more atomic nuclei combined to form one or more (neutrons or protons).





2 Nuclear Fission

the nucleus of an atom splits into two or more smaller nuclei.

ايمان جمال مسعود

Myocardial &metabolic imaging

1

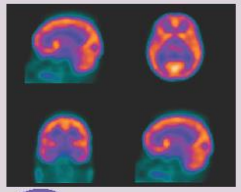
Have considerably advanced and applied to cardiac patients in a clinical setting.

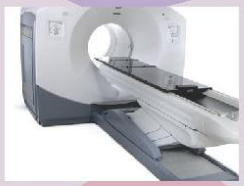
2

Single- Photon Emission Computed Tomography for glucose and fatty acid metabolism.

3

Glucose metabolism is non specifiec SPET radiotracers are currently available to measure myocardial glucose metabolis



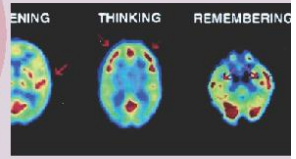


4

Positron Emission Tomography for myocardial oxygen consumption and carbohydrate metabolism.

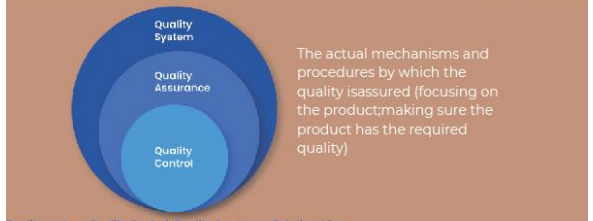
Carbohydrate metabolism studies of myocardial glucose with PET have used FDGb.

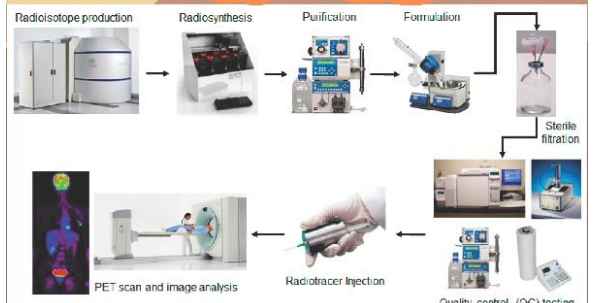
5



ايه عبد الناصر

Quality Control





بنيامين ثروت

RADIOPHARMACEUTICALS

COLD KITS

1. Definition

- prepackaged set of sterile ingredients for specific radiopharmacy as a special type of kit. Pharmaceuticals that are mixed with radioisotopes are used as cold kits.

2. cold kit Properities

- Ligand to which 99mTc is to be complexed (organ specific)
- Reducing agent , Sn(II)-chlorid
- Buffer to adjust the pH for labeling (NaOH/ HCl)
- Stabilizing agents(ascorbic acid)
- Excipients for isotonicity (NaCl)
- The kits are prepared in a freeze-dried form and have a long shelf life, ranging from several months to years.
- Storage in a refrigerator at 2–8°C is advantageous

3. components of cold kits

- active ingredient
- reducing agents
- antioxidants
- buffer

4. Availability

They are available in multidosal, are cost-effective because they are pre-packaged, and cannot be made available in the hospital by the operator.

5. Active Ingredients

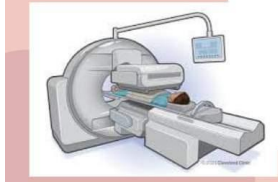
- the compound which forms a complex with metal.
- can be monodentate, bidentate, or polydentate active ingredients depending upon the number of donors in the oxidation.
- Reducanat lowers the oxidation stage with a few active ingredients, like phosphenes.

Prepared by :

- **Benyameen Tharwat**
- **Bola Nasser**
- **Hossam Hassanein**
- **Hassan Mohammed**

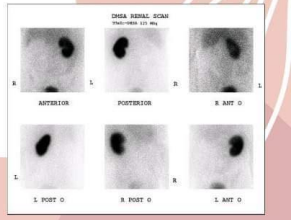
تسنيم محمد

Renal imaging vai radio pharmaceutical



CT scans of the kidneys can provide more detailed information about the ,kidneys than standard kidney , ureter, and bladder (KUB) X-rays thus providing more information related to injuries and/or diseases of .the kidneys

Tc-99m DMSA (2,3 dimercaptosuccinic acid) is a technetium radiopharmaceutical used in renal imaging to evaluate renal structure and morphology.



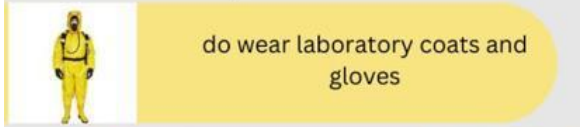
The patient will receive an intravenous injection of the radiopharmaceutical and will lie quietly on an imaging table for 20–30 min. Depending on the protocol, there may be 2 imaging sessions.

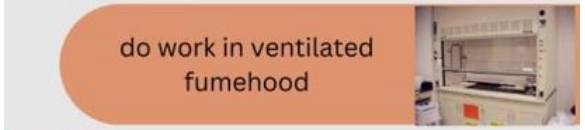
رانيا محمود محمد

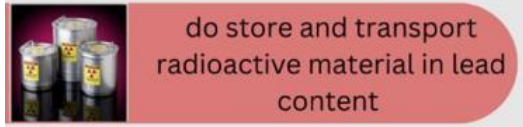
SAFETY PROCEDURES FOR RADIATION

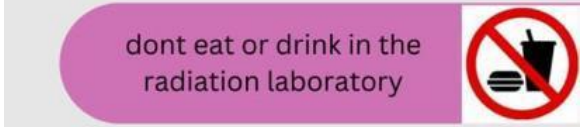
BASIC RADIATION SAFETY PRACTICES

does and donts in radiation protection practice









https://www.cdc.gov › nceh › safety

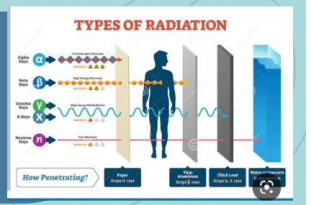
رحاب عطا اسماعيل

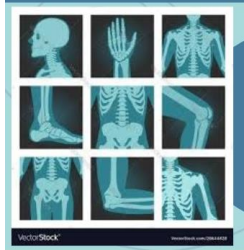
Radioactive decay

Radioactive decay is the emmision of energy in the form of ionizing radiation

Radioactive chart

Types of ionizing radiation
α ionizing
β ionizing
γ ionizing

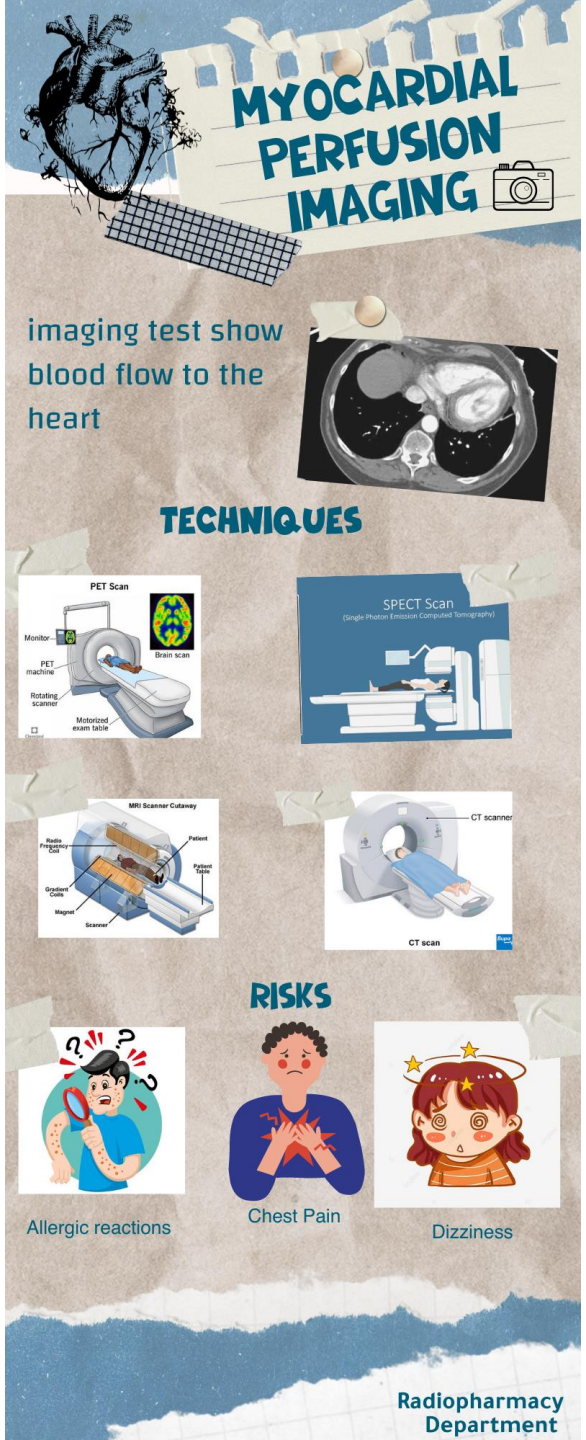




Uses of decay
α ionizing... Treatment of cancer disease
β ionizing.... treatment of bone and eye cancer
γ ionizing...in pasteurization and levelling guage in food packing

The most common disease that arises in exposed to radioactive pollution is cancer, anemia, leukaemia, haemorrhages, and cardiovascular disease.

سارة حموده خليل



شيماء مرعي غانم

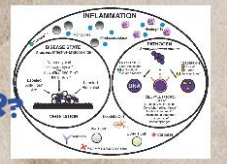
INFLAMMATION AND INFECTION IMIGING

CAN IMAGING DETECT INFECTION?

Imaging studies are frequently used to support the diagnosis of infection in acutely ill patients

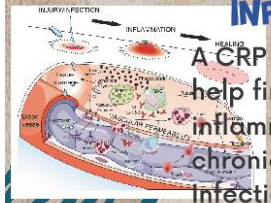
WHAT ARE INFECTION MARKERS?

Inflammatory markers are blood tests used by doctors to detect inflammation in the body, caused by many diseases.



WHAT IS A HIGH INFLAMMATORY MARKER?

A high level of CRP in the blood can be a marker of inflammation



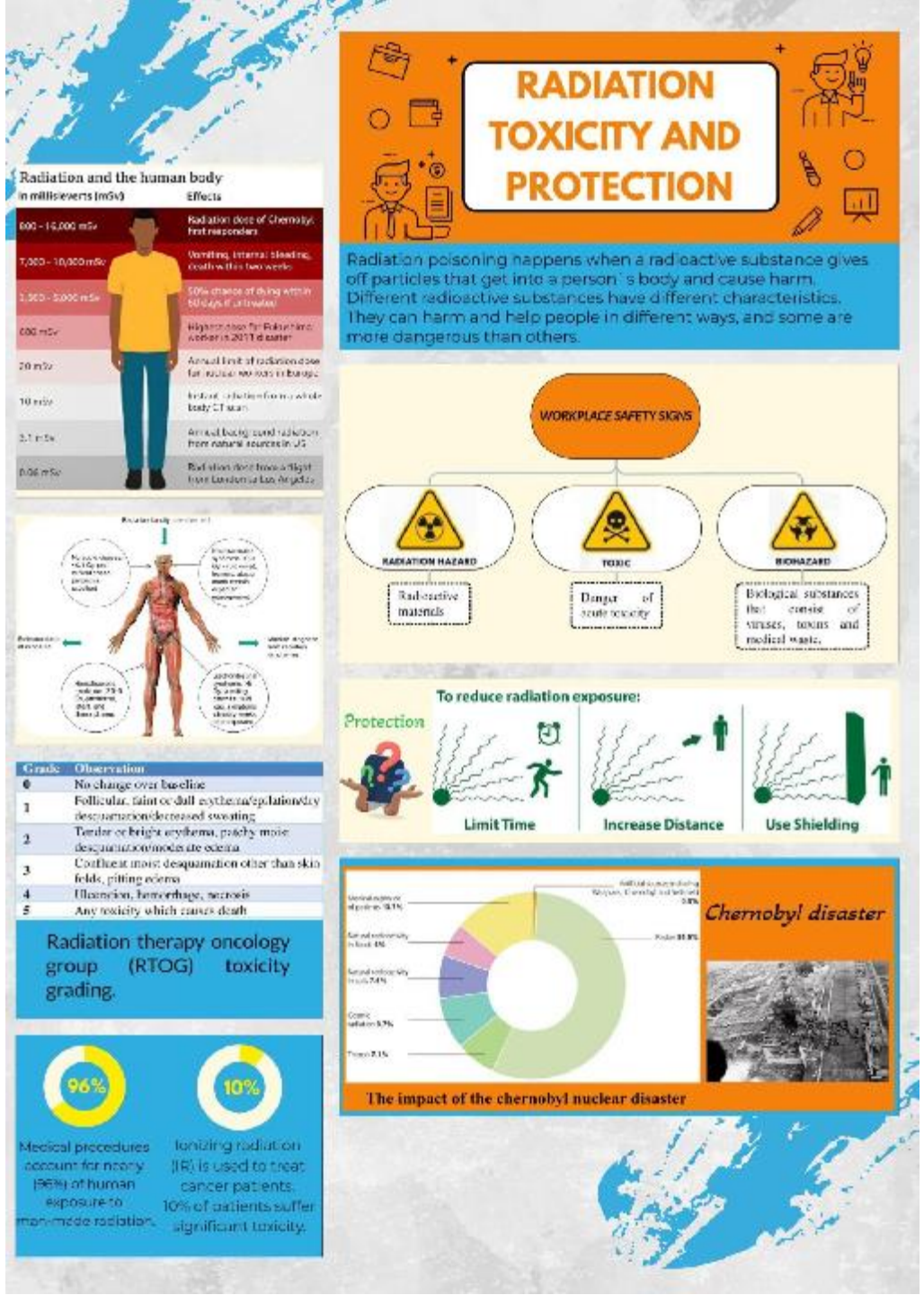
IS THERE A TEST FOR INFLAMMATION?

A CRP test may be used to help find or monitor inflammation in acute or chronic conditions, including:
Infections from bacteria or viruses

WHAT IS INFLAMMATION IN THE BODY?

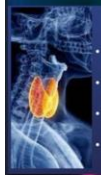
It's a defensive response governed primarily by the immune system, which dispatches white blood cells to the affected sites, resulting in redness and swelling or symptoms such as fever

عبد الرحمن محمد



Tyroid cancer

It's most common in people in their 30s and those over the age of 60. Women are 2 to 3 times more likely to develop it than men.

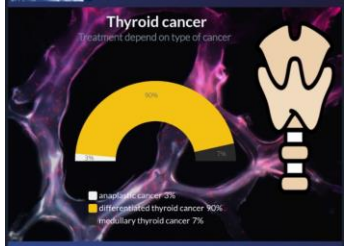


SYMPTOMS

- A lump (nodule) that can be felt through the skin on your neck.
- A feeling that close-fitting shirt collars are becoming too tight.
- Changes to your voice, including increasing hoarseness. Difficulty swallowing.
- Swollen lymph nodes in your neck. Pain in your neck and throat

Thyroid cancer

Treatment depend on type of cancer



MIBG=Meta-Iodo-Benzyl-Guanidine (Which is catecholamine)
in body MIBG is taken up in organs rich in adrenergic innervation and catecholamine
therefore radiolabeled MIBG used in:

- medullary thyroid cancer
- pheochromocytoma
- neuroblastoma

I-131 MIBG

When administrated for tumors other than thyroid cancer, thyroid is protected by administration of potassium iodide prior to I-131 MIBG

Radioactive iodide attached to MIBG can be used in diagnostic scans to identify metastases and estimate dose

SODIUM IODIDE I-123

Iodide I-123 (as sodium iodide I-123) is a radioactive isotope of iodine used in nuclear medicine for the diagnosti and therapeutic study of thyroid disease and cancer. Following oral administration, I-123 is absorbed through the gastrointestinal tract and is taken up by the thyroid gland.

I-131 MIBG SIDE EFFECTS

Bone marrow suppression

Is the major side effect

- Becker DV, Sawin CT. Radioiodine and thyroid disease: the beginning. Semin Nucl Med 1979; 9: 155–164.
- Keston AS, Ball RP, Frantz VK, Palmer WW. Storage of radioactive iodine in a metastasis from thyroid carcinoma. Science 1942; 96(): 362–363

Made with VISME

محمد صلاح محمد

محمود أحمد عبد الظاهر

RENAL IMAGING VIA RADIOPHARMACEUTICAL

Renal scintigraphy uses small amounts of radioactive material called radiopharmaceuticals

Renal scintigraphy uses a special camera and a computer to evaluate your kidney function and anatomy

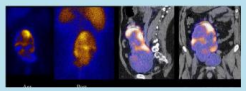
Tell your doctor if there's a possibility you are pregnant or if you are breastfeeding

Discuss any recent illnesses, medical conditions, allergies and medications you're taking with your doctor

Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.

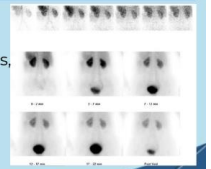
Renal cortical scintigraphy detects the amount of functioning renal cortical tissue

Renal perfusion and functional imaging examines blood flow to the kidneys



Diuretic renal scintigraphy detects kidney blockages or obstruction of urine flow

ACE-inhibitor renal scintigraphy helps determine if the cause of a patient's high blood pressure is coming from the kidneys, due to narrowing of the renal artery or arteries



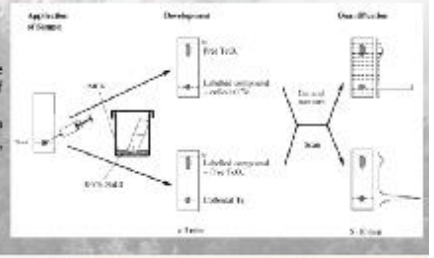
Quality control of radiopharmaceuticals

The purpose of QC: is to ensure that the quality of the produced radiopharmaceutical meets predefined acceptance criteria. These criteria should be based on the radionuclide and the nature of the vector used (if any, chemical/biological structure), the process of preparation, formulation and the intended route of administration.

Quality Control Methods of ^{99m}Tc Pharmaceuticals

- Thin-layer chromatography
- Column chromatography
- Gel permeation
- Electrophoresis
- High-performance liquid chromatography

Determination of the radiochemical purity of radiopharmaceutical by TLC using two different solvents, MEK and saline.



محمد سليمان حسانين

مورين منتصر فاروق

PEPTIDE RECEPTOR RADIONUCLIDE THERAPY

WHAT IS PEPTIDE RECEPTOR RADIONUCLIDE THERAPY

PRRT is a type of targeted cancer therapy that treats neuroendocrine tumors (NETs). It enables the delivery of radioactivity directly to the NET cancer cells.

How does PRRT work

PRRT targets specific receptors located on the surface of tumor cells .The radioactivity damages the tumor cell's DNA and destroys the cell.

WHO NEEDS PRRT?

PRRT is for people with gastroenteropancreatic NETs. These include tumors that occur in the:

- Pancreas
- .stomch
- Rectum
- .small and large intestines.

ADVANTAGE

PRRT is targeted therapy because these radioactive drugs are highly selective in their ability to specifically reach and damage neuroendocrine tumor cells

SIDE EFFECTS

- Neusea
- vomiting
- suppression of blood cell counts

APPLICATION

90Y-DOTATOC and 177Lu-DOTATATE are the most used radiopeptides for PRRT with comparable tumour response rates

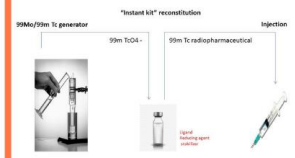
نورما سمير

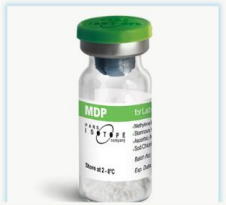
RADIOPHARMACEUTICAL COLD KIT

DEFENITION

Non-radioactive unit-dosed reagent kits.It is efficient and cost-saving method for 99mTc

CONTAINS



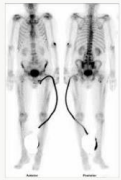


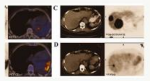
PROPERTIES

sertile &closed system
long shelf life
non-radioactive

PROPLEMS

Fractionation of cold kits in NuclearMedcine under different conditions of temperture





APPLICATIONS

NANOHSA(ALBUMIN COLLOID) for scintigraphic imaging and assessment of sentinel lymph nodes in tumor diseases& Methylene diphosphonate in vivo kit to diagnose 1ry bone tumor

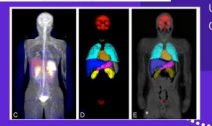
BY : MARIAM JOSEPH, NEVEEN&NORMA

هدی جمال سید

Dosimetry of radiopharmaceuticals

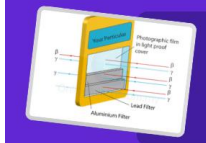
Dosimetry

Measurement of radiation exposure from x-rays, gamma rays, or other types of radiation used in the treatment or detection of diseases, including cancer.



Why do we use dosimetry?

Dosimeters are used to ensure that a harmful dose of radiation is not received over a given period of time.



Devices used in dosimetry

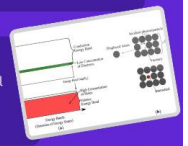
1_salt bridge (film badge)

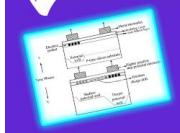
used to measure gamma, x-ray, and high-energy beta radiation.

2_Photodiodes/LED

converts photonic energy to a detectable electrical signal

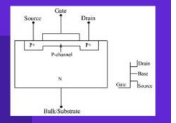
3_Charge couple devices(CCD)charge metal oxide semiconductor (CMOS)





4_Phototransistors

transistors are fundamentally amplifiers

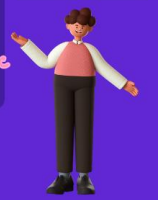


5_Photovoltaic sensors/solar cells

Operation depends upon photovoltaic effect

Units of measure

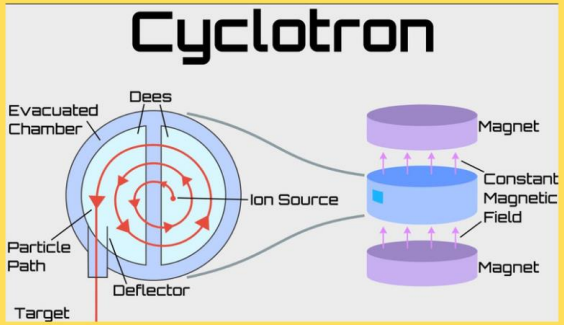
gray (Gy) energy absorbed per unit of mass (J·kg−1) Equivalent dose (H) measured in sieverts (Sv)

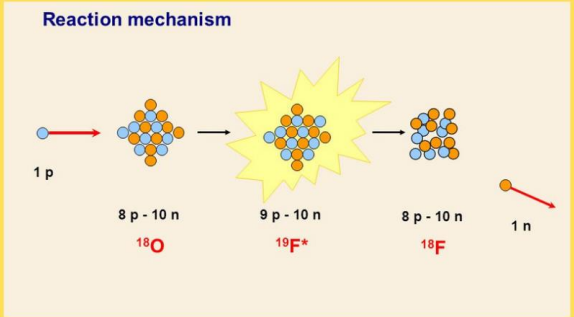


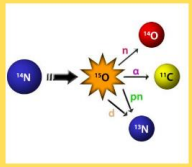
ولاء ناجح ابراهيم

Production of radionuclide via cyclotron

Radionuclides occur naturally or are artificially produced in cyclotron,particle accelerators or radionuclide.







For example

18F, 13N, 11C and 15O, they are produced by cyclotron and useful in nuclear medicine,

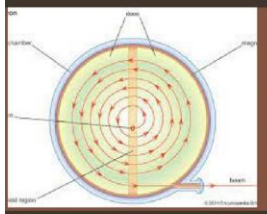
حسام الدين محمود

PRODUCTION OF RADIONULCLIDES VIA CYCLOTRON

Cyclotrons are versatile devices, producing accelerated ion beams which find applications in many areas.

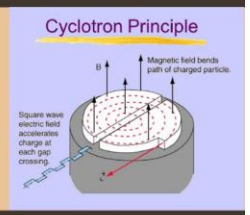
In the field of medicine their use is both in diagnosis and therapy.

the cyclotron produced radionuclides are often neutron deficient and decay mainly by EC or B emission



There are two types of cyclotrons, namely, synchrocyclotrons and isochronous cyclotrons

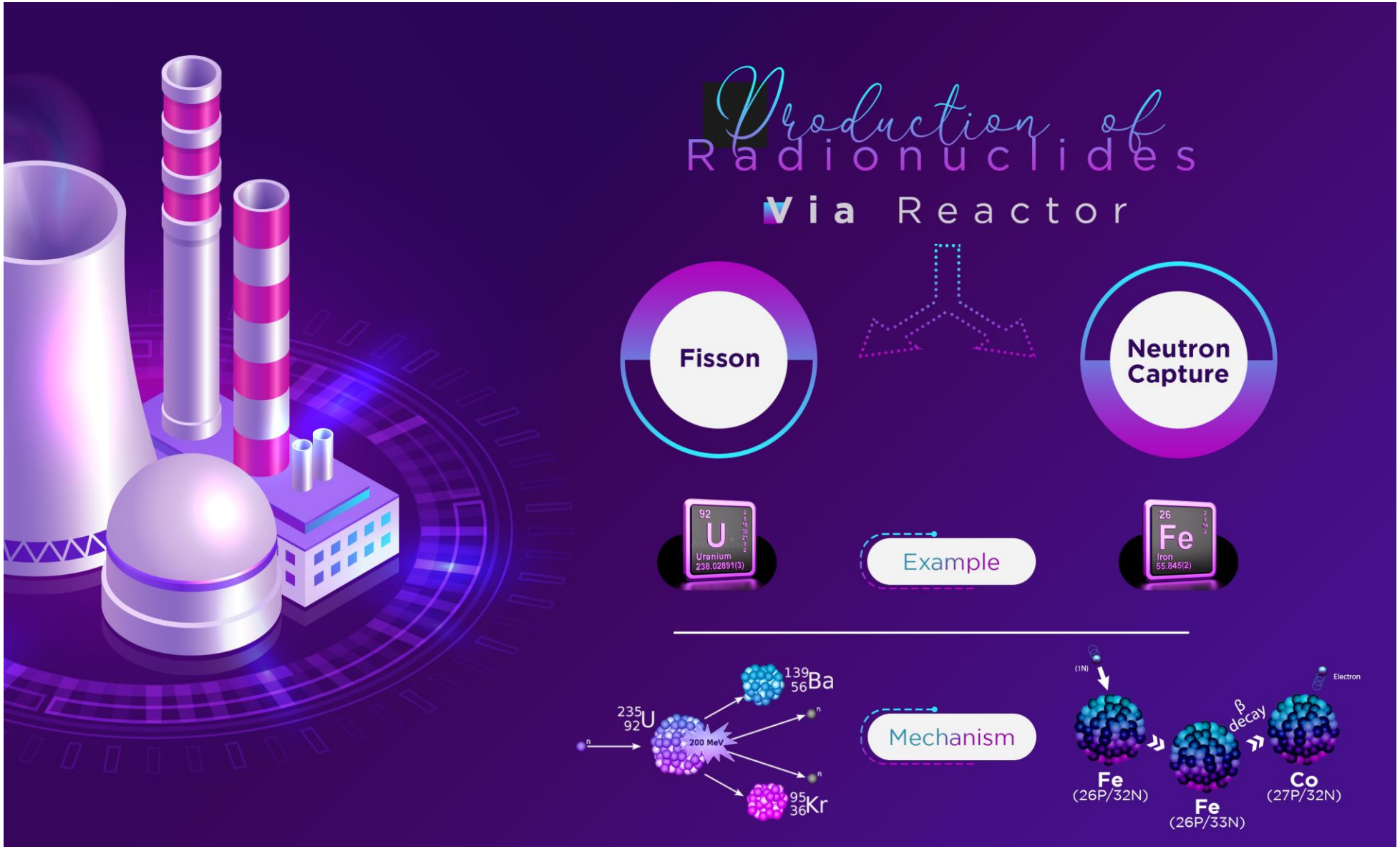
A cyclotron consists of two "D" shaped hollow plates which are sandwiched between two magnetic plates. When a charged particle is introduced at the centre of hollow space between these two "D"s, the charged particle goes to one of the Ds with negative potential and starts to accelerate.



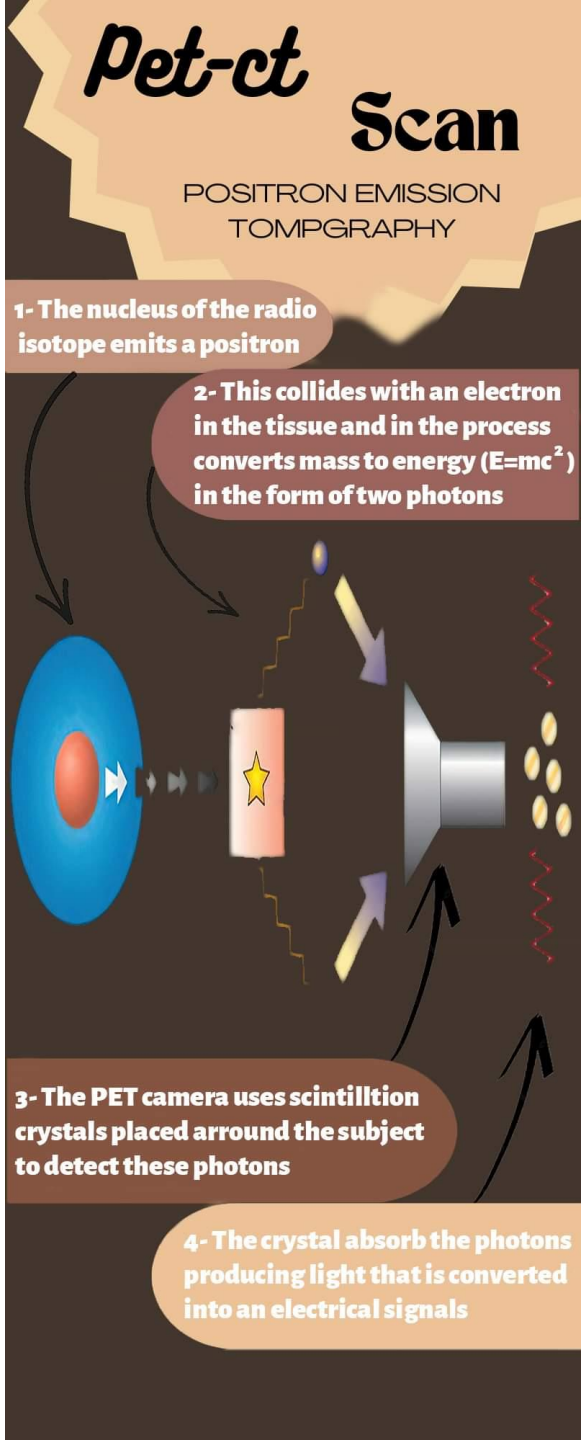
As the magnetic field B is perpendicular to the charged particle's motion, according to the Lorentz' rule, this motion becomes circular. After completing the half circle.

when this particle goes inside the other "D" with negative potential, it moves in the circular motion due to the magnetic field. In this way, a complete circular motion occurs with a radius.

کیرلس فکتور


Production of
Radionuclides
Via Reactor
Fisson
Neutron Capture
92
U
Uranium
238.02891(3)
Example
26
Fe
Iron
55.845(2)
Mechanism
$^{235}_{92}U$
200 MeV
$^{139}_{56}Ba$
$^{95}_{36}Kr$
(1N)
Fe
(26P/32N)
Fe
(26P/33N)
β decay
Electron
Co
(27P/32N)

فادي عماد


Pet-ct
Scan
POSITRON EMISSION
TOMPGRAPHY
1- The nucleus of the radio isotope emits a positron
2- This collides with an electron in the tissue and in the process converts mass to energy ($E=mc^2$) in the form of two photons
3- The PET camera uses scintilltion crystals placed arround the subject to detect these photons
4- The crystal absorb the photons producing light that is converted into an electrical signals

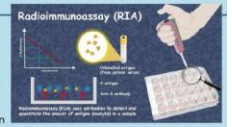
هالة عبد الصمد

WHAT IS RADIOIMMUNOASSAY?

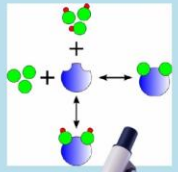
1) DEFINITIONS

Affinity (potency): the tightness with which the ligand binds to the receptor or antibody binding site. This is usually expressed as an equilibrium constant, Kd. The lower the Kd value, the higher the affinity. This also relates to the concentrations of unlabeled ligand that can be measured in the competitive assay

2) PRINCIPLES OF RIA METHOD



The major substances and instruments of regular RIA involve that specific antiserum to the antigen to be measured, availability of a radioactively labeled form of the antigen, a method in which the antibody-bound tracer separated from the unbound tracer, and an equipment to count radioactivity. Due to its widespread applicability, most researchers are not concerned about the fundamental theories of RIA. In reality, RIA is simple in principle. The concentration of an unknown and unlabeled antigen is obtained through comparing its inhibitory effect on the binding of radioactively labeled antigen to a specific antibody with the inhibitory effect of known standards.



3) HISTORY

This method was developed by Solomon Berson and Rosalyn Sussman Yalow at the Veterans Administration Hospital in the Bronx, New York.[3][4] This revolutionary development earned Dr. Yalow the Nobel Prize for Medicine in 1977, the second woman ever to win it.[5] In her acceptance speech, Dr. Yalow said, "The world cannot afford the loss of the talents of half its people if we are to solve the many problems which beset us."[6] Yalow shared the Nobel Prize with Roger Guillemin, and Andrew Schally who earned the prize based on their research into "the peptide hormone production of the brain".[5]

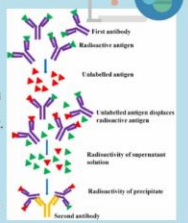
4) TIPS AND FAQS

Particularly when using an automated data reduction system, it is essential that you review your raw data. Check that your Total Count tubes, non-specific binding, zero standard binding and calibration curve shape make sense. If any of your assay components are degrading, you will notice by inspecting your data.

The area of your calibration curve between your zero standard (no analyte standard) binding and your first calibration curve standard will be below the sensitivity of detection. If you need to measure samples below this, you will need to concentrate them

5) PROTOCOL FOR A HYPOTHETICAL RIA

- Equilibrate all reagents to room temperature and mix before use.
- Label duplicate tubes for total counts, NSB (blank), each standard, and each sample.
- Place tubes in a suitable test tube rack.
- Incubate overnight (16 - 24 hours) at 2 - 8°C.
- Add 1 mL of cold Precipitating Reagent to all tubes except total counts, and mix.
- Incubate for 20 - 30 minutes at 2 - 8°C, and centrifuge at 2 - 8°C. for 30 minutes at 1000 - 2000 x g.
- Decant the supernatants from all tubes (except total count tubes) into an appropriate radioactive liquid waste tray.
- Blot the liquid from the rims of the assay tubes on absorbent paper mats for ~ 1 minute.
- Count the radioactivity remaining in the assay tubes (including the Total Count tubes).



PREPARED BY:

- Hala Abdel Samad
- Hadeer Gamal

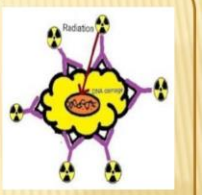
عبد الله محمد

Radio immunotherapy

History of Radio immunotherapy:

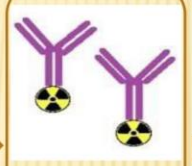
This method was develop by Solomon Berson and Rosalyn Sussman Yalow at the Veterans Administration Hospital in the Bronx, New York. This revolutionary development earned Dr.Yalow the Nobel prize for medicine in 1977. In her acceptance speech ,Dr. Yalow said "The world can not afford the loss of talents of half its people if we are to solve the many problems which best us .

1. Patient receive a dose of monoclonal antibody .

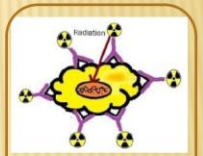


5.The radiotracer directly deliver a high dosage of radiation to the tumor causing DNA damage

2. monoclonal antibodies coupled with cytotoxic radioisotope

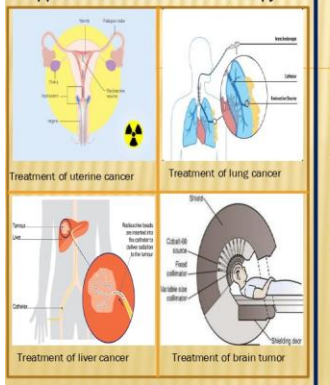


3. Injection of radiotracer into blood stream



4. The radiotracers can bind to the cancer cells .

Applications of radio immunotherapy



Side effects of Radiation

Brain: may cause seizures

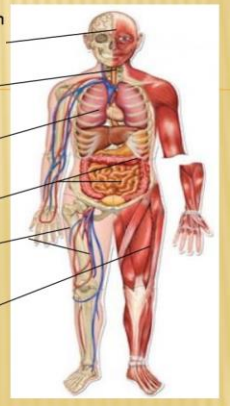
Thyroid gland: radioactive iodine increase thyroid cancer risk

Lungs: inflammation , screening and possible cancer risk

GIT: internal bleeding

Bone marrow and blood vessels: loss of WBCs increase risk of infection

Skin: burns from acute exposure



المقرر الالكتروني
(صيدلة إشعاعية)

المطلوب هو:

<u>الاستماع إلى</u>

- محاضرة Radiation Protection (Dr. Tahani)
- محاضرة Applications of Radiolabeling (Dr. Sara)

<u>حل</u>

Chapter 1 post test-
Chapter 2 post test-
Chapter 3 post test-
General post test-

تم مد مهلة حل الاختبارات حتى يوم 8 يناير 2023 واللازم للحصول على الأربع درجات الخاصة بالمقرر الالكتروني

اسراء أشرف محمود

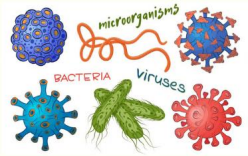
Imaging of inflammation and infection

IMAGING OF INFECTION HAS A VITAL ROLE BOTH IN THE INITIAL DIAGNOSIS AND IN THE CONTINUING MANAGEMENT OF PATIENTS WITH INFECTION OR SUSPECTED INFECTION

1

Types of inflammation
- Acute
- Chronic

Types of infection
- Viral
- Bacterial
- Fungal



2

Properties of ideal imaging agents :
- No side effects
- Specific
- Safe and easy to prepare
- Applicable to immunocompromised pateints

3

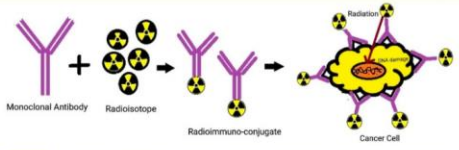
Radiopharmaceuticals used :
- radiolabel leukocytes
- 18F-FDG
- 67Ga-citrate labeled antigranulocyte antibody preparations

4

Imaging Techniques used :
- CT scan
- MRI ultrasound
- SPECT
- PET
- X-Ray

أسماء نبيل عبد اللاه

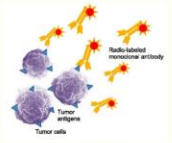
Radioimmunotherapy(RIT)



1

What is Radioimmunotherapy

RIT is a combination of radiation therapy + immunotherapy



2

Use of Radiommunotherapy

treat non-Hodgkin B-cell lymphoma

for newly diagnosed patients

patients have not responded to chemotherapy or treatment with monoclonal antibody

3

What Equipment is used?

start and maintain intravenous catheter, images of patient with gamma camera before or after therapy. Often, single photon emission cumbuted tomography (SPECT) imaging will also be performed.

4

What will you feel during procedure?

Except for intravenous injections, most nuclear medicine procedures are painless

5

Side effects

decrease in blood counts. this lowering of blood counts may result in bleeding or infection. There is a small risk of bone marrow damage.

Additional side effects , which are usually short-term

بنيامين ثروت

RADIOPHARMACEUTICALS

COLD KITS

1. Definition

- prepackaged set of sterile ingredients for specific radiopharmacy as a special type of kit. Pharmaceuticals that are mixed with radioisotopes are used as cold kits.

2. cold kit Properities

- Ligand to which 99mTc is to be complexed (organ specific)
- Reducing agent , Sn(II)-chlorid
- Buffer to adjust the pH for labeling (NaOH/ HCl)
- Stabilizing agents(ascorbic acid)
- Excipients for isotonicity (NaCl)
- The kits are prepared in a freeze-dried form and have a long shelf life, ranging from several months to years.
- Storage in a refrigerator at 2–8°C is advantageous

3. components of cold kits

- active ingredient
- reducing agents
- antioxidants
- buffer

4. Availability

They are available in multidosal, are cost-effective because they are pre-packaged, and cannot be made available in the hospital by the operator.

5. Active Ingredients

- the compound which forms a complex with metal.
- can be monodentate, bidentate, or polydentate active ingredients depending upon the number of donors in the oxidation.
- Reducanat lowers the oxidation stage with a few active ingredients, like phosphenes.

Prepared by :
- Benyameen Tharwat
- Bola Nasser
- Hossam Hassanein
- Hassan Mohammed

مورين منتصر فاروق

PEPTIDE RECEPTOR RADIONUCLIDE THERAPY

WHAT IS PEPTIDE RECEPTOR RADIONUCLIDE THERAPY

PRRT is a type of targeted cancer therapy that treats neuroendocrine tumors (NETs). It enables the delivery of radioactivity directly to the NET cancer cells.

How does PRRT work

PRRT targets specific receptors located on the surface of tumor cells .The radioactivity damages the tumor cell's DNA and destroys the cell.

WHO NEEDS PRRT?

PRRT is for people with gastroenteropancreatic NETs. These include tumors that occur in the:

Pancreas
.stomch
Rectum
.small and large intestines.

ADVANTAGE

PRRT is targeted therapy because these radioactive drugs are highly selective in their ability to specifically reach and damage neuroendocrine tumor cells

SIDE EFFECTS

Neusea
vomiting
suppression of blood cell counts

APPLICATION

90Y-DOTATOC and 177Lu-DOTATATE are the most used radiopeptides for PRRT with comparable tumour response rates

Radiopharmacy

No	Surname	Post Test 1	Post Test 2	Post Test 3	General Post Test	total
1	احمد حسن محمد حسين	95	95	100	93.33	4
2	احمد عاطف احمد ابراهيم	85	95	100	93.33	4
3	احمد عامر مهدى محمد	100	100	100	98.33	4
4	احمد محمد عبدالحميد ابوالعلا	90	100	100	91.67	4
5	اسراء احمد عبد الحق محمد				98.33	1
6	اسراء اشرف محمود محمد	100	100	100	78.33	4
7	اسراء جلال سعد على	95	100	95	86.67	4
8	اسراء عبدالفتاح على سيد	100	100	100	96.67	4
9	اسراء محمد على محمد	95	100	100	98.33	4
10	اسماء محمود عبدالحميد فرج	95	80	90	83.33	4
11	اسماء نبيل عبدالله محمد	100	85	100	80	4
12	آلاء عبد الجواد محمود عبدال	100	100	100	100	4
13	امانى عبدالحميد عبدالقادر در	90	100	100	98.33	4
14	امانى عبدالسلام سيد محمد	95	100	100	90	4
15	اميره ابراهيم حمايه الله كومى	90	100	100	78.33	4
16	اميره احمد محمد سيد	75	100	100	90	4
17	اميره عادل ابراهيم عبدالبديع	100	100	100	96.67	4
18	اميره محمود حسن محمد	100	100	100	100	4
19	انطون اميل نسيم صرافيل	90		95	36.67	3
20	انطون روماني وليم فهمي	95	100	100	96.67	4
21	ايرينى نجار توفيق رزق	90	100	100	91.67	4
22	ايمان جمال مسعود ابراهيم	100	100	100	96.67	4
23	ايه سعيد عبدالسلام سعيد	100	100	100	98.33	4
24	ايه عبدالناصر جامع عبيد	80	100	100	96.67	4
25	ايه فرحان حجاب حسين	95	95	100	98.33	4
26	بكر محمد بكر محمد	85	100	90	55	4
27	بنيامين ثروت وديع زخارى					0
28	بولا ناصر نجيب ميخائيل	100	100	95	90	4
29	تسنيم محمد عبدالمجيد محمد	90	90	100	95	4
30	جهاد حسن محمد محمود	100	100	100	96.67	4
31	جيهان محمد حسن حسن	95	95	100	88.33	4
32	حسام الدين محمود جمعه حس	85	100	95	53.33	4
33	حسام حسانين محمد شحاته	100	100	100	98.33	4
34	حسن محمد عبد الموجود عم	90	100	100	85	4
35	داليا حلمى محمد احمد		20	60	38.33	1
36	دعاء محمد هاشم حسين			95	88.33	2
37	دينا طلعت يوسف ادم	95	95	100	86.67	4
38	رانيا عبد الرحمن محمود اسد	90	100	100	95	4
39	رانيا محمود محمد عميرة	100	95	100	91.67	4
40	رحاب عطا اسماعيل سليم	100	100	100	100	4
41	رحاب ماهر احمد محمد	90	100	100	88.33	4
42	رضوى زكريا عبد الرحمن م		100	100	100	3

Radiopharmacy

No	Surname	Post Test 1	Post Test 2	Post Test 3	General Post Test	total
43	ريهام محمود سيد زكى	100	100	100	98.33	4
44	زهوه علاء الدين فتحى صابر	100	80	100	90	4
45	زياد سعيد محمد بسيوني	90	90	95	78.33	4
46	ساره جمال احمد محمد	95	90	95	90	4
47	ساره حموده خليل محمد	80	95	100	80	4
48	سميه مصطفى عبد الفتاح مح	90	95	100	100	4
49	شيماء مرعى غانم عبدالوها	100	95	80	85	4
50	عبد الرحمن خالد سيد ابراهي	80	95	100	66.67	4
51	عبد الرحمن محمد عبدالرازق	100	100	100	93.33	4
52	عبد الله محمد حسن محمود	100	95	100	95	4
53	عبير على تمام متولى	100	100	100	95	4
54	عثمان محمد عثمان عبد العال	85	95	100		3
55	على محمد يونس بخيت	85	100	100	98.33	4
56	علياء احمد محمد احمد	100	100	95	96.67	4
57	فادى عماد لطيف عازر	100	100	100	100	4
58	كرستينا فضل مكرم جاد	95	100	100	96.67	4
59	كريم شحاته رضا اسماعيل	90	100	100	93.33	4
60	كيرلس باسم منير غيط	85	100	100	98.33	4
61	كيرلس فكتور عزمى بشاي	90	100	100	93.33	4
62	كيرلس ماهر لويز باخوم					0
63	كيرلس هاني حنا لبيب	85	100	95	0	4
64	مايكل روميل راغب ويصا	95	100	100	100	4
65	محمد صلاح محمد محمد	100	100	100	100	4
66	محمد طلعت نعيم على	95	100	100	83.33	4
67	محمد عبد المنعم طه احمد	100	100	100	96.67	4
68	محمد فاروق حسن على	85	85	100	83.33	4
69	محمد فولى سليم فرغلى	85	100	100	93.33	4
70	محمود احمد عبد الظاهر أحم	100	100	100	100	4
71	محمود رشاد مصطفى محمد	95	100	100	55	4
72	محمود سليمان حسانين درويـ	100	95	100	100	4
73	محمود محروس صديق محمد	100	100	100	91.67	4
74	محمود محمد عبد الحسيب ع	90	95	100		3
75	مريم جوزيف فهمى قرياقوص	90	100	100	90	4
76	مريم عادل مبروك بسطا	90	100	100	95	4
77	معاذ على عبدالراضى عبدالغ	85	100	45	51.67	3
78	منتصر صلاح سنوسى سيد	80	65			1
79	مورين منتصر فاروق زاخر	80	100	95	93.33	4
80	ندى صابر صديق محمد	85	25	100	55	3
81	نورما سمير بخيت لبيب	90	100	85	96.67	4
82	نيفين خميس فارس شحاته	100	95	95	100	4
83	هاله عبد الصمد احمد عبد الـ		100	100	98.33	3
84	هايدي ياسر عبدالوهاب احمد	100	100	100	98.33	4

Radiopharmacy

No	Surname	Post Test 1	Post Test 2	Post Test 3	General Post Test	total
85	هبه الله عماد حسانين احمد	90	100	100	81.67	4
86	هدى جمال سيد محمد	90	100	100	88.33	4
87	هدير جمال عبد المحسن	100	95	100	78.33	4
88	وائل اشرف تامر عطا الله	95	85	95	90	4
89	ولاء ناجح ابراهيم عبد الكريم	95	95	100	93.33	4
90	يارا خلف حسن على	90	100	100	91.67	4
91	ياسر ابوالفتوح جاد الكريم مح	90	95	100	88.33	4
92	زينب أحمد سيد أحمد					0
		84	83	85	86	
		91.30%	90.22%	92.39%	93.48%	

Radiopharmacy

No	Surname	Post Test 1	Post Test 2	Post Test 3	General Post Test	total

نسبة تفعيل الاختبارات البعدية	45.65%
نسبة تفعيل الاختبارات البعدي العام	14.02%
نسبة تفعيل النشاط الاخير	4.24%
نسبة تفعيل الاستاذ	20.00%

نسبة التفعيل	83.91%

١٩-١١- ٢٠١٩

السيد الأستاذ الدكتور/ عميد كلية الصيدلة

نرجو من سيادتكم التكرم بالموافقة و اتخاذ اللازم نحو مخاطبة رئيس قسم علاج الأورام و الطب النووي بكلية الطب (جامعة أسيوط) لتنظيم زيارة لطلاب الفرقة الرابعة (مقرر الصيدلة الإشعاعية) إلي القسم يوم الأحد الموافق ١ ديسمبر ٢٠١٩ من الساعه الرابعة للخامسة و نصف مساءا ، و ذلك بالتنسيق مع أ.د. وليد دياب ، مدير وحدة المسح البوزيتروني بالقسم.

و لكم جزيل الشكر،،،

أ.د. تهاني حسن الفحام

منسق مقرر الصيدلة الإشعاعية

١٩-١١- ٢٠١٩

السيد الأستاذ الدكتور/ رئيس قسم علاج الأورام و الطب النووي

نرجو من سيادتكم التكرم بالموافقة و اتخاذ اللازم نحـــو تنظـــيم زيارة لطلاب الفرقة الرابعة (مقرر الصيدلة الإشعاعية) إلي القسم يوم الأحد الموافق ١ ديسمبر ٢٠١٩ من الساعه الرابعة للخامسة و نصف مساءا ، و ذلك بالتنسيق مع أ.د. وليد دياب ، مـــدير وحـــدة المســـح البوزيتروني بالقسم.

و لكم جزيل الشكر،،،

أ.د. محمود محمد شيحة

عميد كلية الصيدلة

بيان بالنشاط الطلابي في مقرر الصيدلة الإشعاعية

مقرر الصيدلة الإشعاعية هو مقرر اختياري يدرسه جزء من طلاب الفرقة الرابعة ببرنامج العلوم الصيدلية في الفصل الدراسي الأول. يهتم المقرر بتعريف الطلاب بأساسيات الصيدلة الإشعاعية وتطبيقاتها العملية وكل ما يخص المستحضرات الصيدلية المشعة بداية من التحضير ومراقبة الجودة وانتهاء بطريقة استخدام المستحضرات في التشخيص والعلاج.

يتم خلال الفصل الدراسي استضافة د وليد أحمد دياب الأستاذ المساعد بقسم علاج الأورام والطب النووي ومدير وحدة الطب النووي بالمستشفى الجامعي لإلقاء محاضرة للطلاب يتم فيها تعريف الطلاب بالتطبيقات الإكلينيكية للمستحضرات الصيدلانية المشعة والإجابة عن جميع تساؤلات الطلاب مما يساعد بشكل كبير في استيعاب المقرر وتطبيقاته العملية.

كما يتم تنظيم زيارات ميدانية لقسم الطب النووي خلال الفصل الدراسي أو بعد انتهاءه يطلع فيها الطلاب على الاستخدام العملي للمستحضرات المشعة في التشخيص والعلاج.