OCTOBER UNIVERISTY
FOR MODERN SCIENCES AND ARTS
جامعة أكتوبر للعلوم الحديثة والآداب

Pharmacogno

PHG 112
PG 102

Associate Professor Dr Soumaya Saad Zaghl

Fall 2024

كلية الصيدلة

رؤية الكلية

كلية الصيدلة جامعة اكتوبر للعلوم الحديثة والآداب تساهم بفاعلية في تحقيق رؤية مصر المستقبلية والوصول لترتيب متميز قوميا وإقليميا وعالميا.

Vision

The Faculty of Pharmacy, October University for Modern Sciences and Arts, contributes effectively to achieving Egypt's future vision and reaching a distinguished ranking nationally, regionally, and globally.

كلية الصيدلة

رسالة الكلية

تلتزم كلية الصيدلة جامعة أكتوبر للعلوم الحديثة والآداب بتقديم برامج تعليمية متطورة بشراكة دولية لإعداد صيدلي قادر على المنافسة والابتكار وريادة الأعمال قوميا وإقليميا وعالميا وتقديم أفضل الخدمات الصحية في إطار أخلاقيات المهنة، كما تلتزم الكلية بإجراء بحوث علمية تطبيقية، المشاركة المجتمعية الفعالة متبنييه بذلك أهداف التنمية المستدامة

Mission

The Faculty of Pharmacy, October University for Modern Sciences and Arts, is committed to providing advanced educational program with international partnership to prepare a pharmacist capable of competition, innovation, and entrepreneurship nationally, regionally, and globally, and to provide the best health services within the framework of professional ethics. The Faculty is also committed to conducting applied scientific research and effective community services, thereby adopting the goals of sustainable development.

الأهداف الإستراتيجية للكلية

-تحسين تنافسية جودة الطلاب والخريجين
-الارتقاء بمنظومة البحث العلمي وتطوير برامج الدراسات العليا
-بناء كوادر تدريسية وإدارية متميزة.
-استدامة الجودة الشاملة لرفع مستوى الاداء التنافسي للمؤسسة
-رفع مستوى المشاركة المجتمعية وتعزيز فرص التنمية المستدامة

NARS: National Academic Reference Standards

المعايير القومية المرجعية الاكاديمية

It is the minimum level of knowledge and skills that a graduate must possess to ensure good practice of his profession. These standards have been set by the National Authority for Quality Assurance of Education and Accreditation agency (NAQAAE)

NARS → **Programme LOs** → **Course LOs**

Learning outcomes (Knowledge and skills): measurable achievements that the learner will be able to understand after learning processes is completed

National Academic Reference Standards (NARS) for Pharmacy Education

NARS-Pharmacy (2nd Edition) Approved the from the board of directors of NAQAAE in April 2017

Competencies of the Pharmacy Graduates

Four Competency Domains are included in the competency-based National Academic Reference Standards for Pharmacy Education.

These domains are designed to cover all essentials for practicing pharmacy profession including both drug-oriented and patient-oriented disciplines.

Each domain should be achieved through a number of Competencies ranging from one to six, with a total of twelve competencies for all domains.

These competencies are overall broad statements that cover various areas of the graduate performance. A number of Key Elements ranging from two to seven are included in each competency, with a total of forty two key elements for all competencies. These key elements demonstrate how pharmacy graduate will reflect each competency in practice.

The competency domains are the followings:

Domain 1: Fundamental Knowledge

Domain 2: Professional and Ethical Practice

Domain 3: Pharmaceutical Care

Domain 4: Personal Practice

Overall Aims of the Module

The course introduces the student to the knowledge and skills that enable him to differentiate between different organs of crude drugs through their monographs (seeds, fruits, herbs, subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , identifying their active constituents and adulterants, description of micro- and macro-morphological characteristics, benefits and precautions of their medicinal uses, side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

Mapping CLO to programme and NARS key elements		
NARS Key element	Programme Key element	Course learning outcome (CLO)
1-1-1- Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioural, administrative, and clinical sciences	1-1-1-2- Demonstrate understanding of knowledge of pharmaceutical sciences.	1-1-1-2-1 Utilize the basics of plant morphological and anatomical characters to be used in the preparation of pharmaceuticals from crude drugs of seeds, fruits, herbs and subterranean organs as well as unorganized drugs & drugs of animal origin.

1-1-3- Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.	**1-1-3-1- Integrate knowledge from fundamental sciences to handle, identify, extract, and analyse synthetic/natural materials/ products.**	**1-1-3-1-1 Apply the acquired knowledge to identify the main key element, morphological character and active constituents of medicinal plants from different organs.**
1-1-4- Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.	1-1-4-1- Articulate knowledge from fundamental sciences to explain pharmacological and toxicological effects of drugs.	1-1-4-1-1 Correlate the active constituents to the pharmacological actions, uses, toxicity, contraindications and side effects of medicinal plants of different organs (seeds, fruits, herbs and subterranean organs as well as unorganized drugs & drugs of animal origin)
2-2-1 Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.	2-2-1-1- Isolate, identify, purify, analyse and standardize synthetic/natural pharmaceutical materials.	2-2-1-1-1 Identify important crude drugs (from seeds, fruits, herbs and subterranean organs) microscopically.

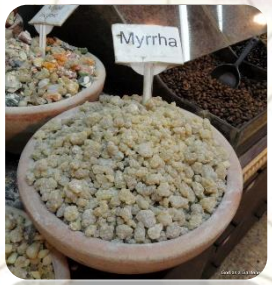
3-2-6 Maintain public awareness on social health hazards of drug misuse and abuse.	**3-2-6-1- Provide the community with evidence based information on social health hazards of drug misuse and abuse.**	**3-2-6-1-1 Study the health hazards and social impact of natural drug abuse.**
4-1-1 Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	4-1-1-2- Express time management skills.	4-1-1-2-1 Work effectively to meet deadlines.
4-1-2 Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	4-1-2-1- Retrieve and critically evaluate information from various data resources	4-1-2-1-1 Analyze critically the regained data from different resources.
4-3-2 Practice independent learning needed for continuous professional development.	4-3-2-1- Select proper resources for continuous life-long learning.	4-3-2-1-1 Manage the use of the library and internet resources required for continuous education.

Assessment Details

Item	PG 102	PG112
Quizzes:	5 Marks	5 Marks 3.3%
Assignments:	10 Marks	15 Marks 10%
Practical Exam(s)	20 Marks	40 Marks 26.7%
Mid Term Exam	15 Marks	30 Marks 20%
Final Exam	35 Marks	60 Marks 40%
Oral Exam	15 Marks	----------
TOTAL	100 Marks	150 Marks

Course Content

- Seeds
- Fruits
- Herbs
- Subterranean organs
- Unorganised drugs



REFERENCES

1. **Trease& Evans' Pharmacognosy by William Charles Evans, 2002.**
2. **Botany : An introduction to Plant Biology, Third edditionby James D. Mauseth,2008**
3. **Fundamentals of Pharmacognosy and Phytotherapy by Michael Heinrich, Joanne Barnes, Simon Gibbons, and Elizabeth M. Williamson, 2004**

Electronic Materials, Web Sites

http://www.hort.purdue.edu/newcrop/med-aro/default.html
http://www.herbmed.org/
http://www.danish-schnapps-recipes.com/plants.html
http://www.botanical.com/

Pharmacognosy

PHG 112
PG 102

Lecture 1

Interactive teaching methods & activities

https://www.youtube.com/watch?v=bUjVHUf4d1I

https://www.youtube.com/watch?v=74A4yVggSjY

https://www.youtube.com/results?search_query=linseeds
https://www.youtube.com/watch?v=b7j2RMNtAYk

Quizizz

↘

By the end of the lecture, students should be able to demonstrate knowledge of:

- - Nutraceuticals &Cosmeceuticals
- -Definition of seed & its function
- - Different layers in the seed
- - Different types of seeds

Nutraceuticals &Cosmeceuticals

Nutraceuticals

“ LET FOOD BE YOUR MEDICINE ”

Hippocrates

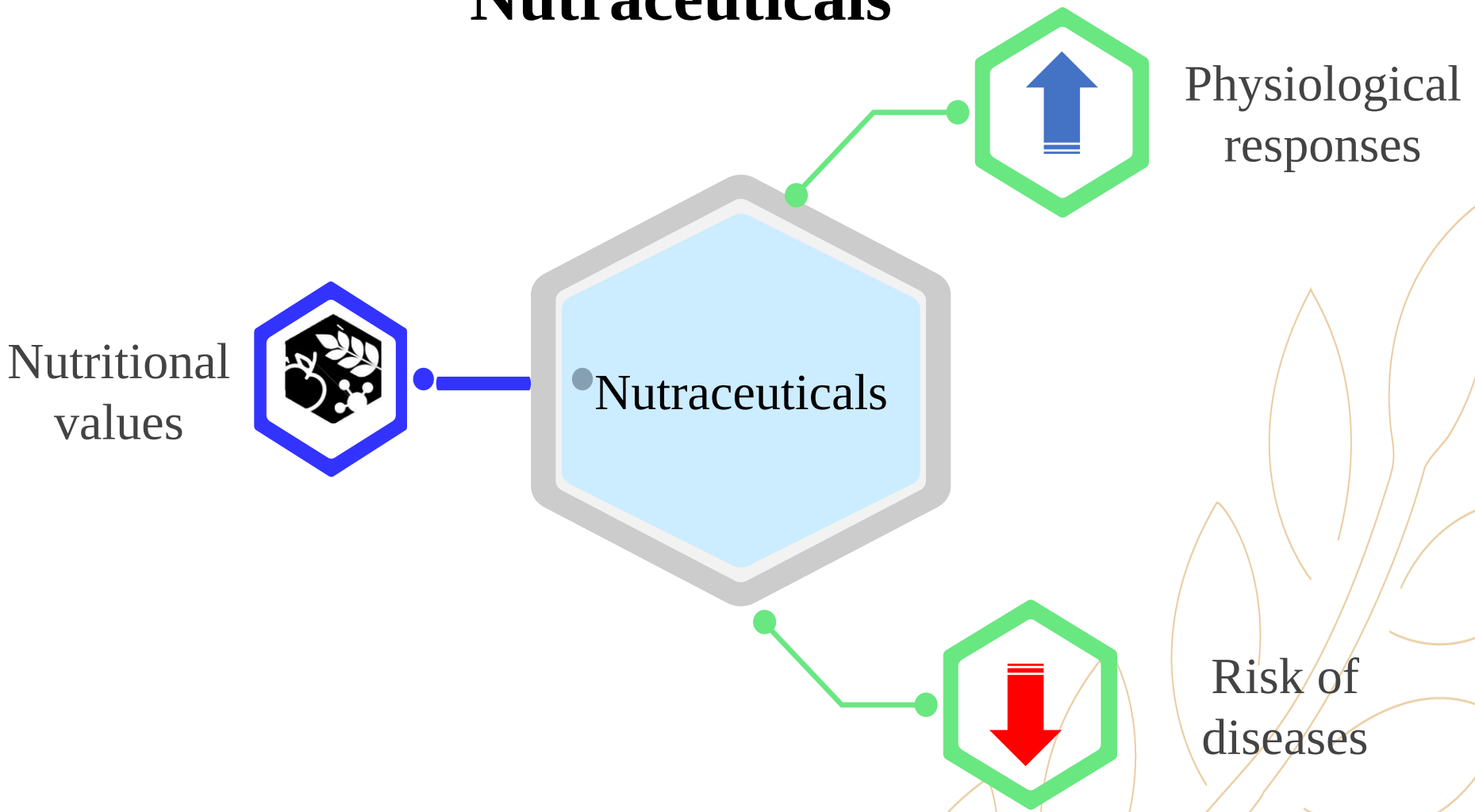
What is meant by Nutraceuticals

- Nutraceuticals is a broad umbrella term that is used to describe any product derived from food sources with extra health benefits in addition to the basic nutritional value found in foods.

- Nutraceutical products can be considered **non-specific biological therapies** used to promote general well-being, control symptoms, and prevent malignant processes.

- Their role in human nutrition is one of the most important areas of investigation, with wide-raging implications for consumers, healthcare providers, regulators, food producers, and distributors.

Nutraceuticals



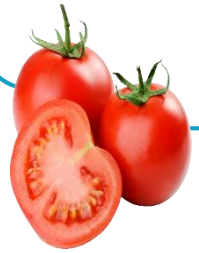
Examples of Nutraceuticals

Organosulfur compounds

Reduce total and LDL cholesterol

Catechins

Reduce risk of certain types of cancer



Lycopene

Reduce risk of certain types of cancer

Flavonoids, Phenolic acids

Antioxidant, anticancer, antiinflammatory, … etc.

Cosmeceuticals

What is meant by Cosmecuticals

- Cosmeceuticals are topical agents that offer properties of both cosmetics, which beautify or enhance appearance, and drugs, which therapeutically alter the skin’s physiology and/or reverse a disease process.

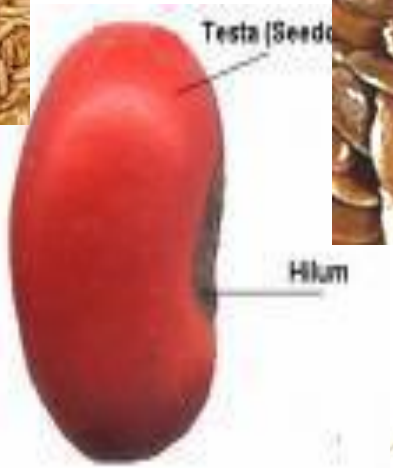
- Cosmeceuticals typically contain at least one distinguishing ingredient and purport beneficial effects beyond the abilities of purely cosmetic products, commonly claiming to improve skin function, texture, tone, radiance, or firmness.

Examples of Cosmeceutical agents used in different formulas

Liquorice

Aloe

Seeds



Definition:

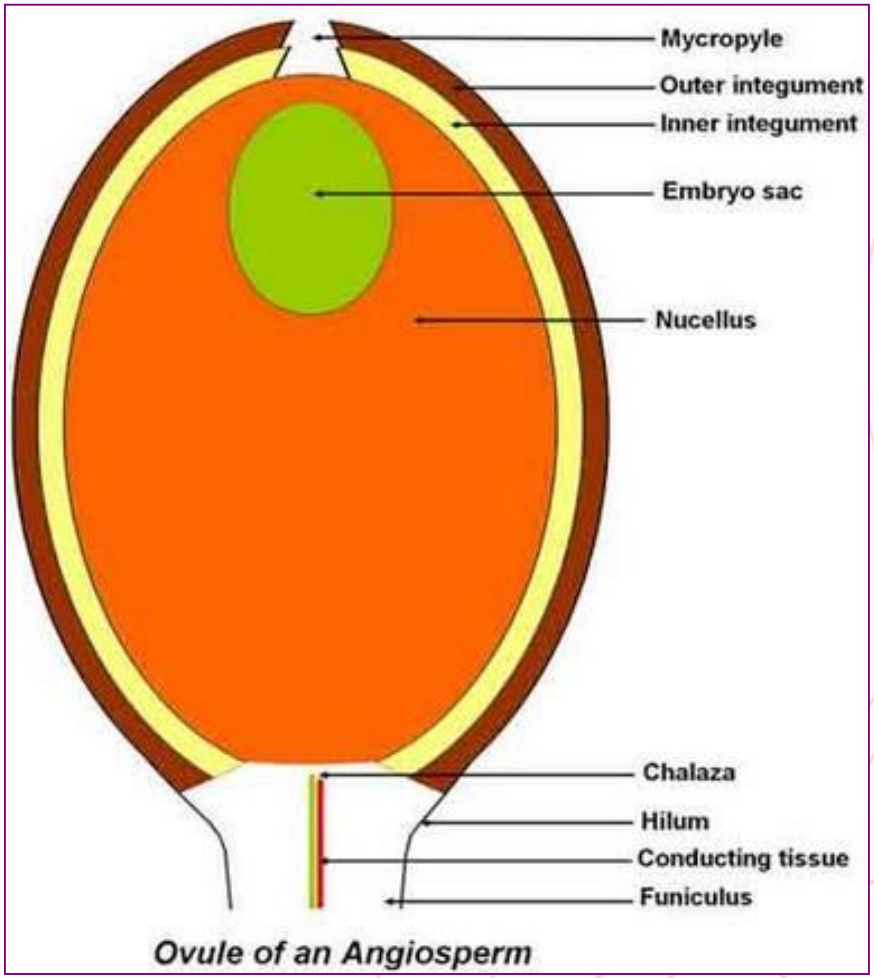
Mature fertilized ovule that contains an embryo.

Its function is to facilitate transportation and to ensure continuation and distribution of the plant.

THE MATURE OVULE

It consists of:

1- Nucellus.
2- Micropyle.
3- Integuments.
4- Embryo sac.

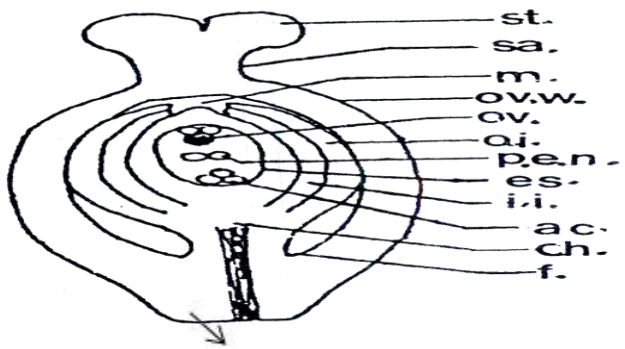


THE TESTA SHOWS ON ITS OUTER SURFACE CERTAIN MARKINGS

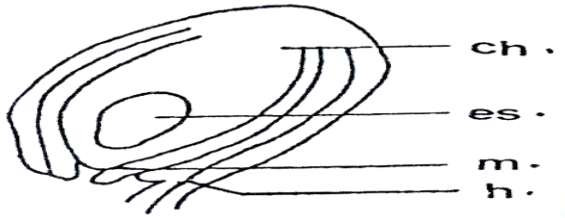
- **The hilum**: It is the scar left by the removal of the seed from its funicle or stalk
- **The microphyle** : It results because the coats at the apex not quite complete leaving such a scar
- **The chalaza:** The basal swollen part of the nucellus from which arise the integuments& where the vascular strand from the funicle branches to enter different parts of ovule
- **The raphe** :Arises from fusion between the funicle with the integument It is present in anatropous ovule e.g. Linseed and amphitropous ovule e.g. Colchicum

TYPES OF OVULES

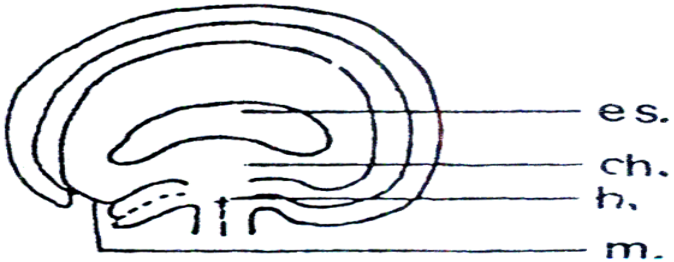
Types of ovules
St., stigma; sa., style; m., micropyle; ov.w., ovary wall; ov.; ovule; o.i, outer integument; i.i., inner integument, p.e.n., primary endosperm nucleus; e.s., embryo sac; a.c., antipodal cells, ch., chalaza; f., funicle.



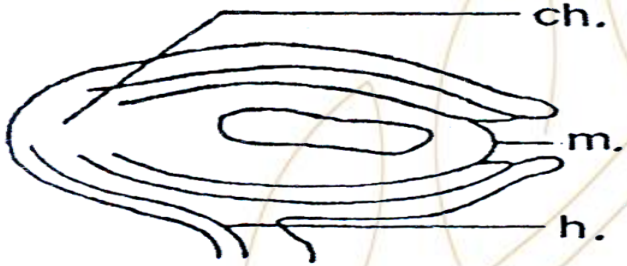
Atropous



Anatropous



Campylotropous



Amphitropous

A TYPICAL SEED CONSISTS OF

1- Testa formed of one or two seed coats

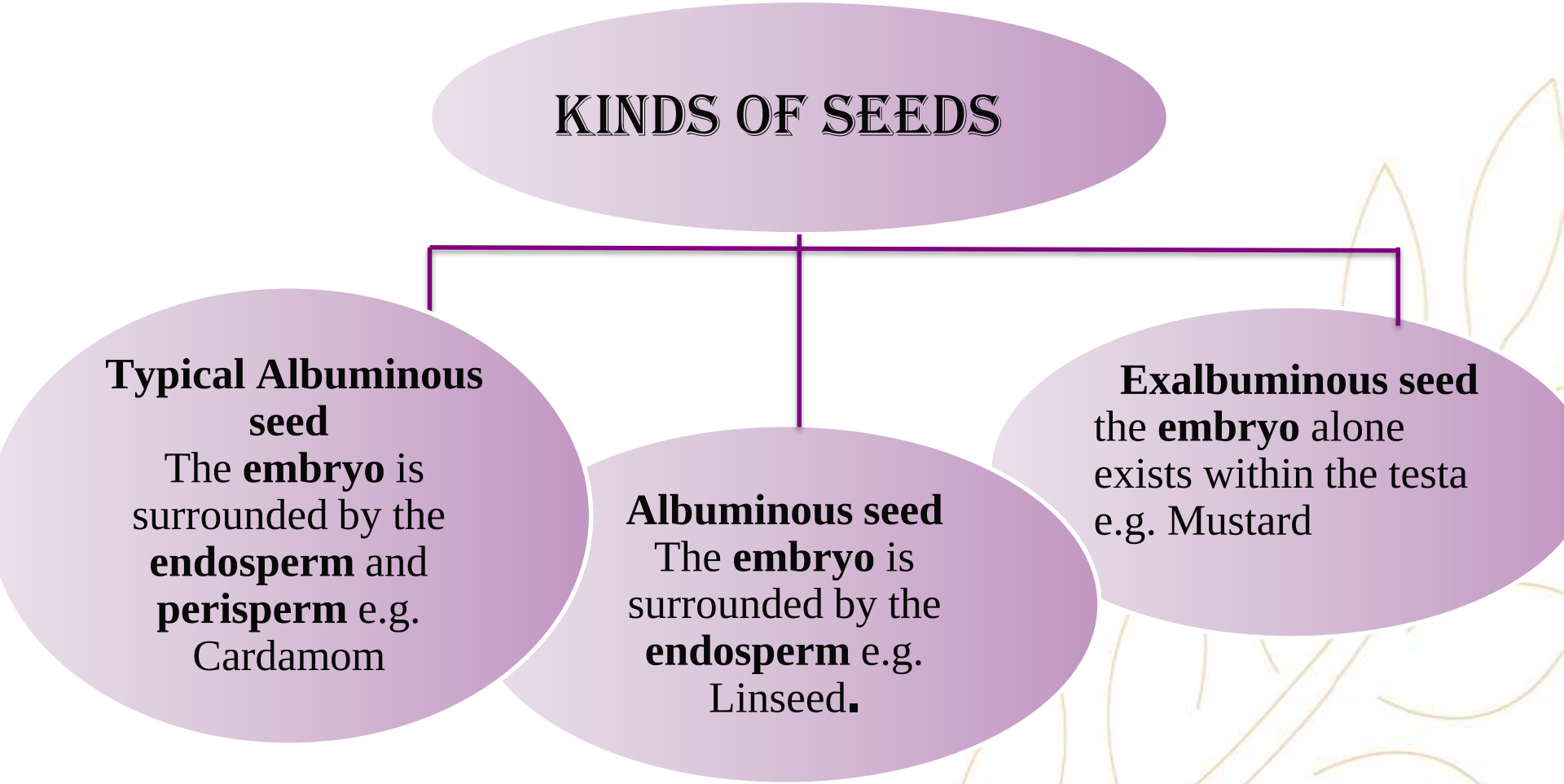
2- Perisperm

3- Endosperm surrounding the embryo

4- An embryo developed from the fertilized ovum

- **a-Cotyledons:** one or two which store food for growth
- **b- Plumule:** It is the stem growing point
- **c) Radicle:** It forms the root system

The Kernel: the structure of the seed enclosed within the testa



THE TESTA (SEED COAT)

seeds with a testa of one coat
Foenugreek,
Nux vomica,
Strophanthus

seeds with a testa of two coats
Linseed, Colchicum,
Cardamom, Mustard

OUTGROWTH OF THE TESTA

During the formation of certain seeds from the ovule arise additional growths outside the integument or developed from the integuments

- Different names are given to these outgrowths according to their origin and nature

OUTGROWTH OF THE TESTA

1- Arillus

arises from the funicle or the tissue of hilum e.g. Cardamom

2-Arillode

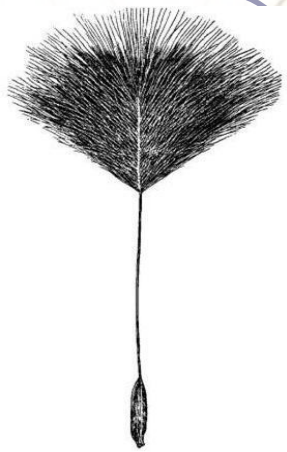
arises from the tissue of micropyle e.g. Nutmeg

3- Strophiole

local enlargement along the line of the raphe e.g. Colchicum seed

4- Wing

Awn e.g. Strophanthus



MICROSCOPICAL CHARACTERS

A- Testa
- Epidermis
- Hypodermis,
-Pigment layer,
-Sclerenchyma,
- Nutritive layer

B-Kernel
- Perisperm
- Endosperm
- Embryo

C-Reserve Food Materials
(Cell Content)

MICROSCOPICAL CHARACTERS

(A)TESTA:

- **Epidermis**
- **Hypodermis**
- **Pigment layer**
- **Sclerenchyma**
- **Nutritive layer**

B- THE KERNEL

the structure of the seed enclosed within the testa

THE PERISPERM may be large or membranous coat or hardly distinct

- **Large containing starch *e.g.* Cardamom**
- **Small *e.g.* Ricinous**
- **Infolding penetrating the endosperm *e.g.* Nutmeg**

THE ENDOSPERM may be <u>starchy</u> *e.g.* F. Graminae,

<u>oily</u> *e.g.* Anise

having <u>hemicellulosic walls</u> *e.g.* Colchicum and Nux vomica

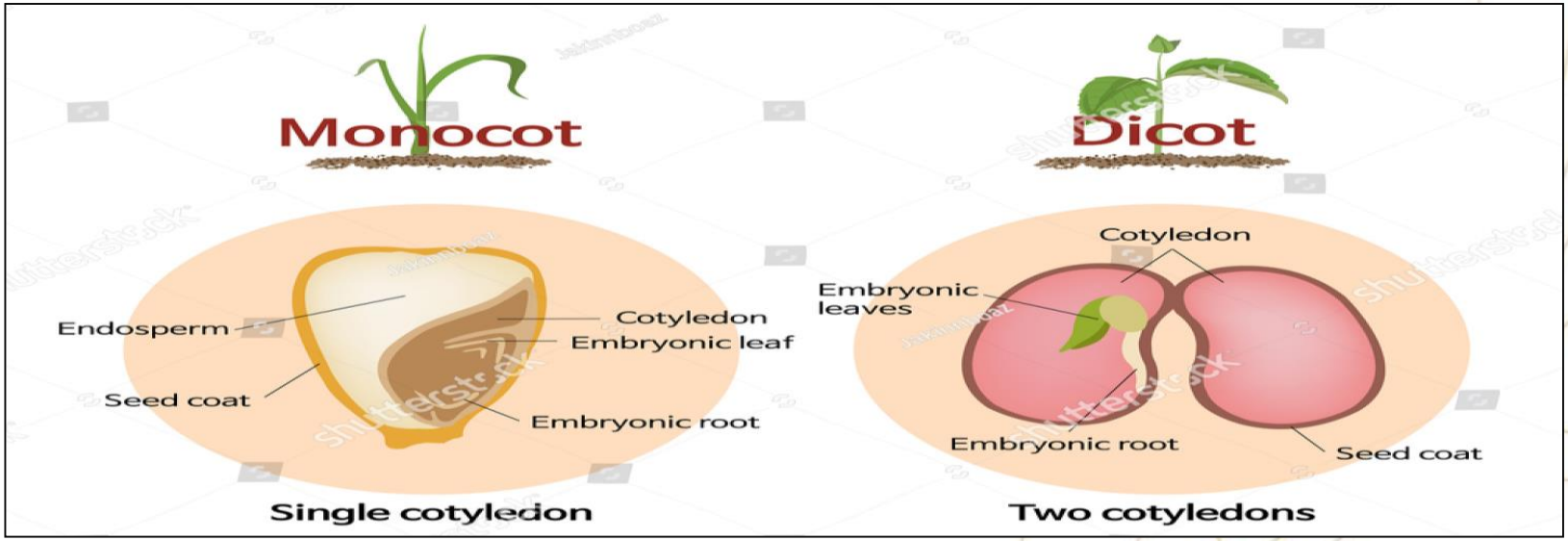
THE EMBRYO

consists of -

a) one cotyledon (monocotyledon) or two cotyledons (dicotyledons) or more -

b) Plumule: It is the stem growing point

c) Radicle: It forms the root system



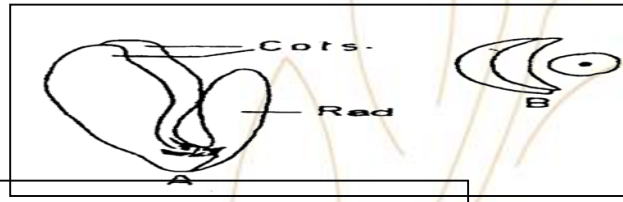
TYPES OF EMBRYO

1- Straight

e.g. Linseed

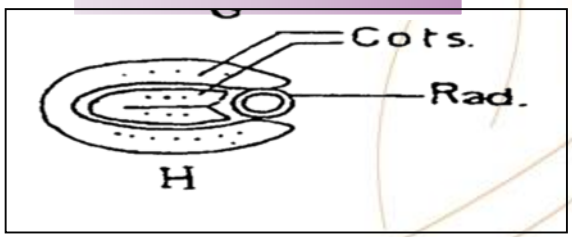
2- Bent on itself

a) Incumbent



b) Accumbent

c) Orthoplocus



RESERVE FOOD MATERIALS

Starch: It gives blue colour with iodine
e.g. Wheat, Maize & Cardamom

Protein
- Amorphous mass e.g. Cardamom
- Aleurone grains in ripe seeds e.g. Leguminoseae
It gives red colour with Millon's reagent and yellow ppt with picric acid

Fixed oil and fat
It gives red colour with sudan III

Ca Ox Crystals

Home work

- 1- Enumerate the types of ovules
- 2- Enumerate scars on the surface of the seed
- 3- Enumerate outgrowth on the surface of the testa giving examples
- 4- Enumerate different types of embryo giving examples
- 5-What is meant by: albuminous seed, exalbuminous seed, kernel

Faculty of
Pharmacy

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Thank You!

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