



**2022/2023**

## **Fifth Stage**

**First Semester/ Industrial Pharmacy II**



# **Capsules DF**

## **Lecture 17**

**Monday : 19/12/2022**

**Dr. Ahmed Najim Abood**  
**Assistant Professor in**  
**Pharmaceutics**

**ahmed.abood@uobasrah.edu.iq**



<https://images.app.goo.gl/Hwxh86M4cDsrbpYEA>



# Topics

- ✓ General description
- ✓ Types
- ✓ Manufacturing of capsules (materials, methods and equipment)
- ✓ Capsules problems or defects
- ✓ Quality control



# General description:

Are solid dosage forms that are most commonly composed of gelatin shells or containers designed to contain one or more medicinal agent and inert ingredients (powder, semisolid or liquid fill).

The word capsule is derived from latin capsula- means small box.



Advantages: ?? Related to (taste, appearance, manufacturing (minimal excipients and little pressure) and biopharmaceutical considerations)

Disadvantages: ??? Related to (Stability problems, content properties and weight variation)



# Types

According to the type of capsule shell : **Gelatin and non gelatin capsule or called vegetarian capsules (starch, PVA, seaweed and HPMC types)**

According to gelatin shell composition (gelatin : plasticizer ratio) or hardness: (each type suitable for certain region)

Two pieces, **hard (1:0.4), medium (1:0.6)**

Single piece, **soft gels (1:0.8).**

According to the release pattern: **modified released capsules (enteric, sustained or extended) and plain capsules.**

According to the route of administration: **oral, rectal and vaginal capsules.**

According to the shape: **oblong, oval, tube and round.**



# Manufacturing of capsules

Is varied with variation of capsules type (hard or soft).

For hard and medium gelatin capsule (HGC) type, in general we have some similarities with tablet formulations, while in soft gels, we have similarities with oily solutions.



# Hard and medium gelatin capsules

## Materials:

Involves :

- a) The empty gelatin capsule shells
- b) The fill content (Mainly bulk powder, semisolid or liquid in state).



# The capsule shells:



Mainly with **oblong** shape, consist of cap and body.  
Found into different sizes

Size	Volume	Fill weight(g) at 0.8 g/cm <sup>3</sup> powder density
000	1.37	1.096
00	0.95	0.760
0	0.68	0.544
1	0.50	0.400
2	0.37	0.296
3	0.30	0.240
4	0.21	0.168
5	0.13	0.104





The capsules size depend on the properties of the powder to be filled (the density and compressibility), but generally certain types of powder may be used for estimation of the capacity (in weight units) of each capsule size like aspirin, sodium bicarbonate and quinine sulphate.



The gelatin capsule shell is mainly consists of gelatin blends **?**, water and other additives (plasticizer, preservative, sugar, colorant, opaquant and surfactant).

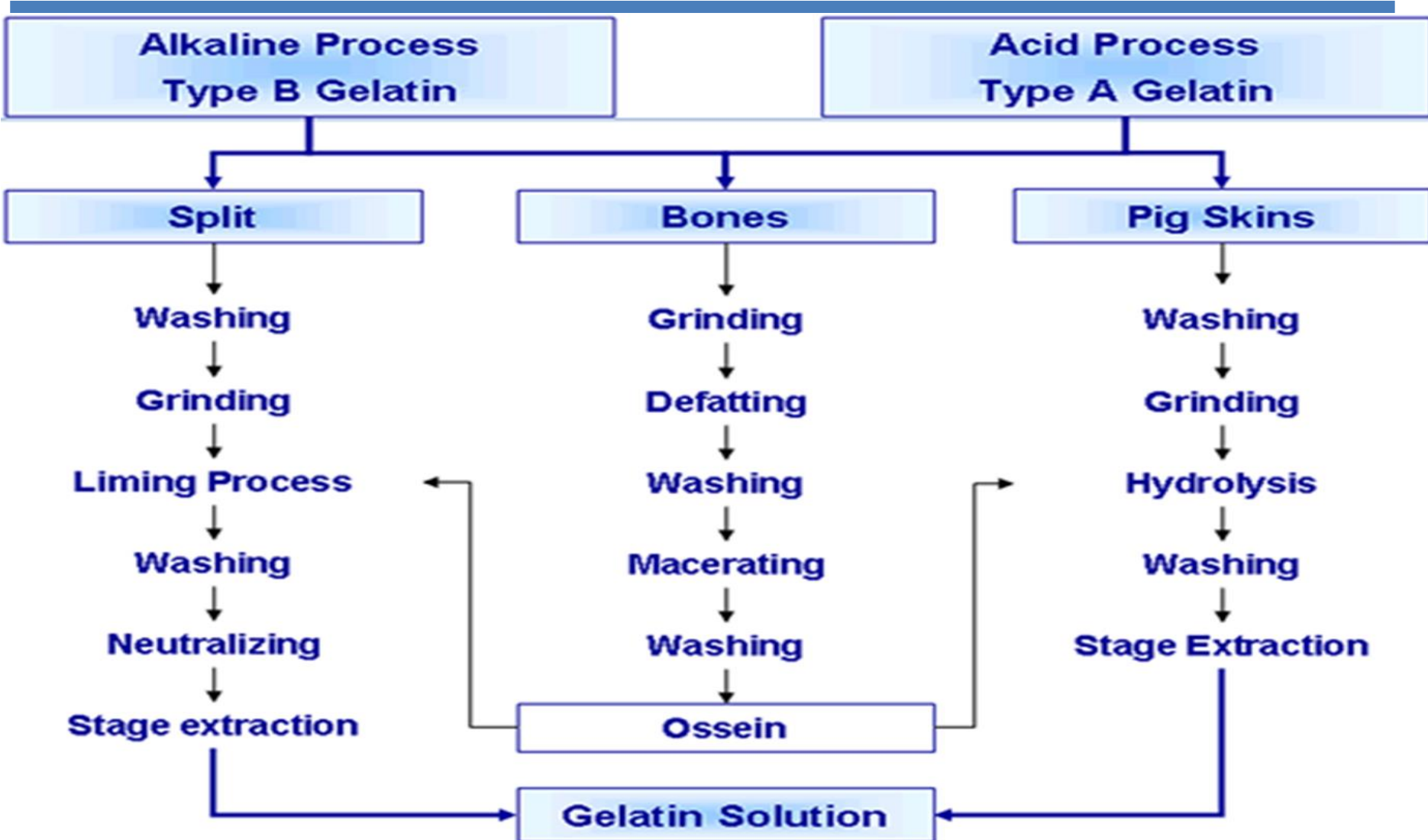
# Gelatin

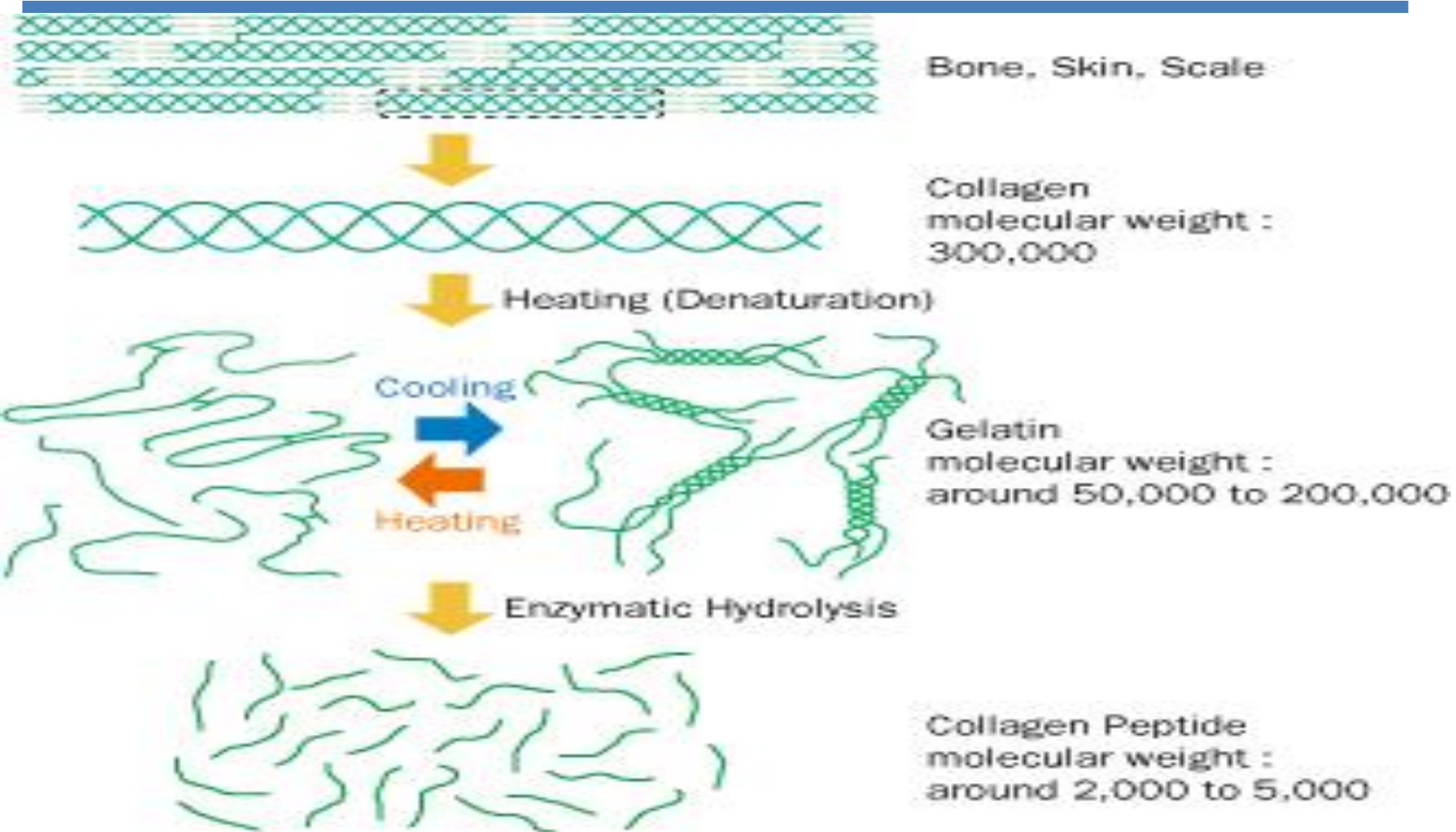
It is a colorless, almost tasteless, translucent proteinaceous substance that is brittle when dry and elastic when prepared with controlled amount of moisture. It is produced by irreversible, partial hydrolysis of collagen, which is obtained from animal (calf and pork) skin and bones by either partial acidic or alkaline hydrolysis, so two types of gelatin are obtained.

**Type A= Acid (HCl) treated precursor  
with IEP= 9 (from skin)**

**Type B= Alkali (Lime) treated precursor  
with IEP= 4.7 (from bones)**











Gelatin has different advantages like:  
**Safety, solubility, good mechanical properties upon drying, excellent rheological properties at high temperature (sol form) and then forming (gel form) at low temperature.**