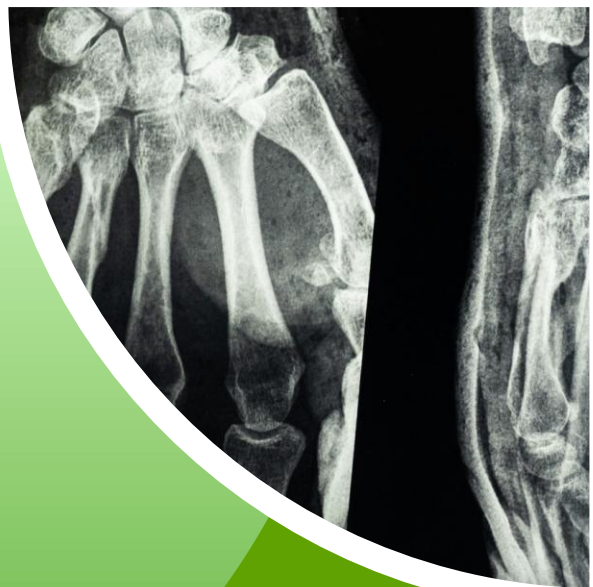
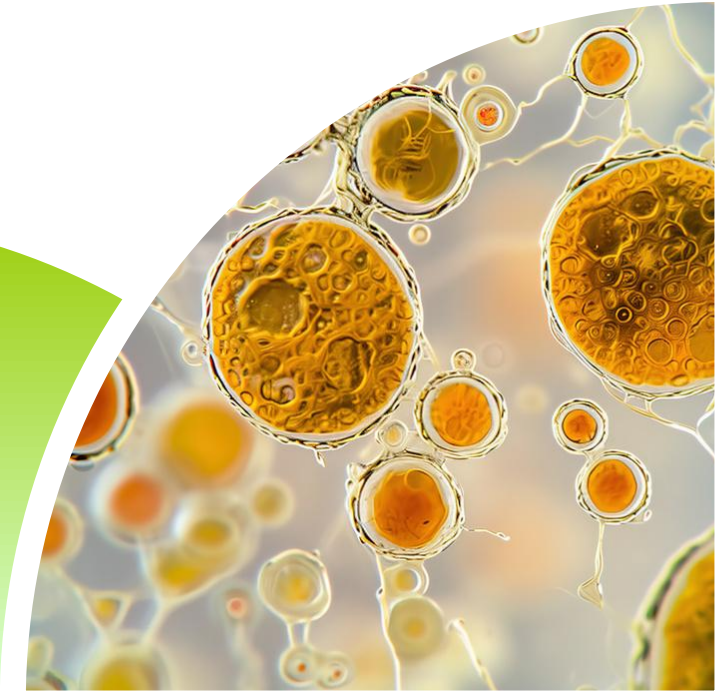




มหาวิทยาลัยราชภัฏนครปฐม

Mechanism and Illness of Human Body 2



*Lecturer Unchisa Rattanakunuprakarn
Asst.Prof. Jutatip Tepsuwan
Lecturer Napat Rattanahongsa*

Course description

Change in **structure of function**,
malfunction of control **mechanism**,
reaction of **pathological disease**,
disease mechanism and various system
malfunctions, **application of nursing**
practice, and practice



Course Learning Outcomes

◆ 1

Describe structural and functional changes, abnormal regulatory mechanisms, and pathophysiological responses occurring in disease conditions.

◆ 2

Describe case studies concerning disease mechanisms and dysfunctions of body systems.

◆ 3

Communicate health care approaches with older adults experiencing illnesses in community setting.



Brief of contents

A detailed anatomical illustration of the human circulatory system, showing the heart, lungs, and the network of arteries and veins throughout the body. The illustration is in a classic, scientific style with labels in German. It is positioned on the left side of the slide, partially obscured by a green diagonal banner.

1

Disorders of Cellular and Tissue

2

Disorders of the Immune System

3

Disorders of the Cardiovascular System (part 1)

4

Disorders of the Cardiovascular System (part 2)

5

Disorders of the Hematologic System

Brief of contents

A detailed anatomical illustration of the human circulatory system, showing the heart, lungs, and the network of arteries and veins throughout the body. The illustration is in a classic, scientific style with labels in German. It is positioned on the left side of the slide, partially obscured by a green diagonal graphic element.

6

Disorders of the Nervous System (part 1)

7

Disorders of the Nervous System (part 2)

8

Disorders Fluid, Electrolyte, and Acid–Base

9

Disorders of the Urinary System

10

Disorders of the Reproductive System

Brief of contents

A detailed anatomical illustration of the human circulatory system, showing the heart, lungs, and the network of arteries and veins throughout the body. The illustration is in a classic, scientific style with Latin labels.

11

Disorders of the Endocrine and Metabolic Systems

12

Disorders of the Musculoskeletal System

13

Disorders of the Respiratory System

14

Disorders of the Gastrointestinal System (part 1)

15

Disorders of the Gastrointestinal System (part 2)

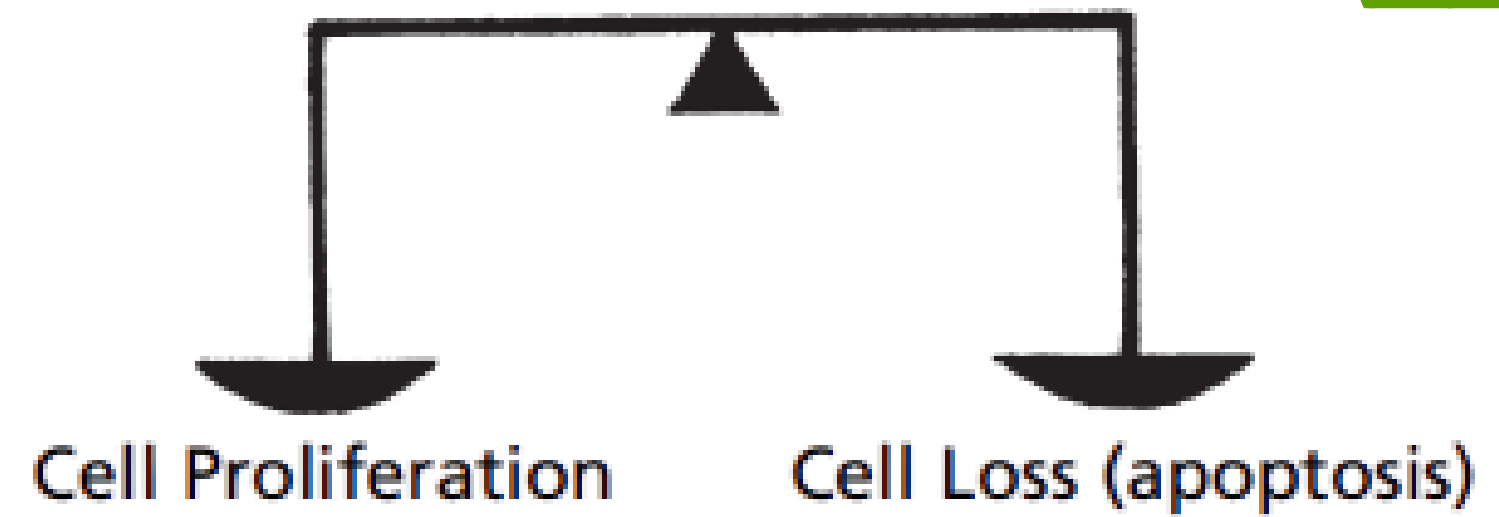
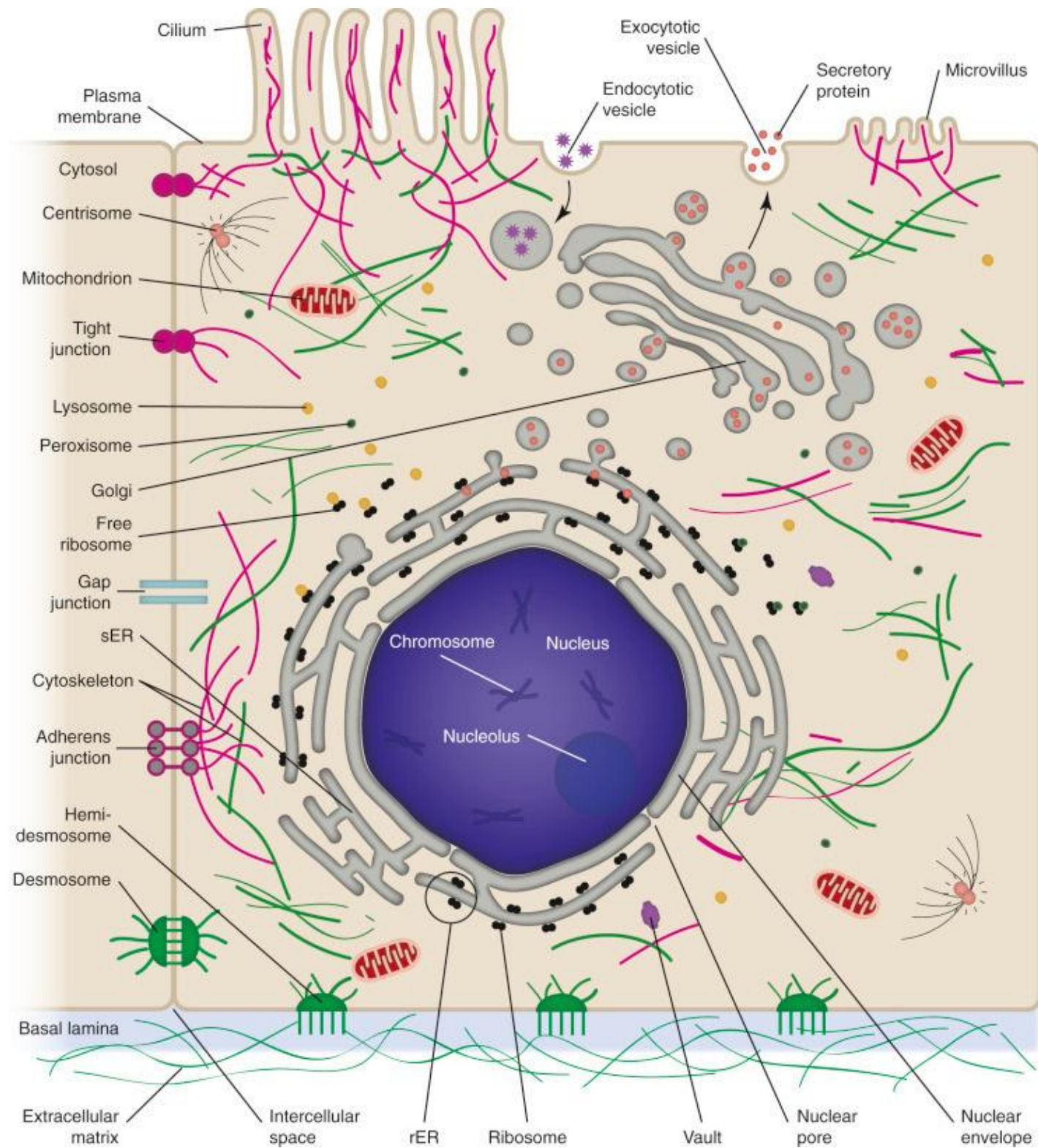
16

Communicate health education to older adults in community setting

1

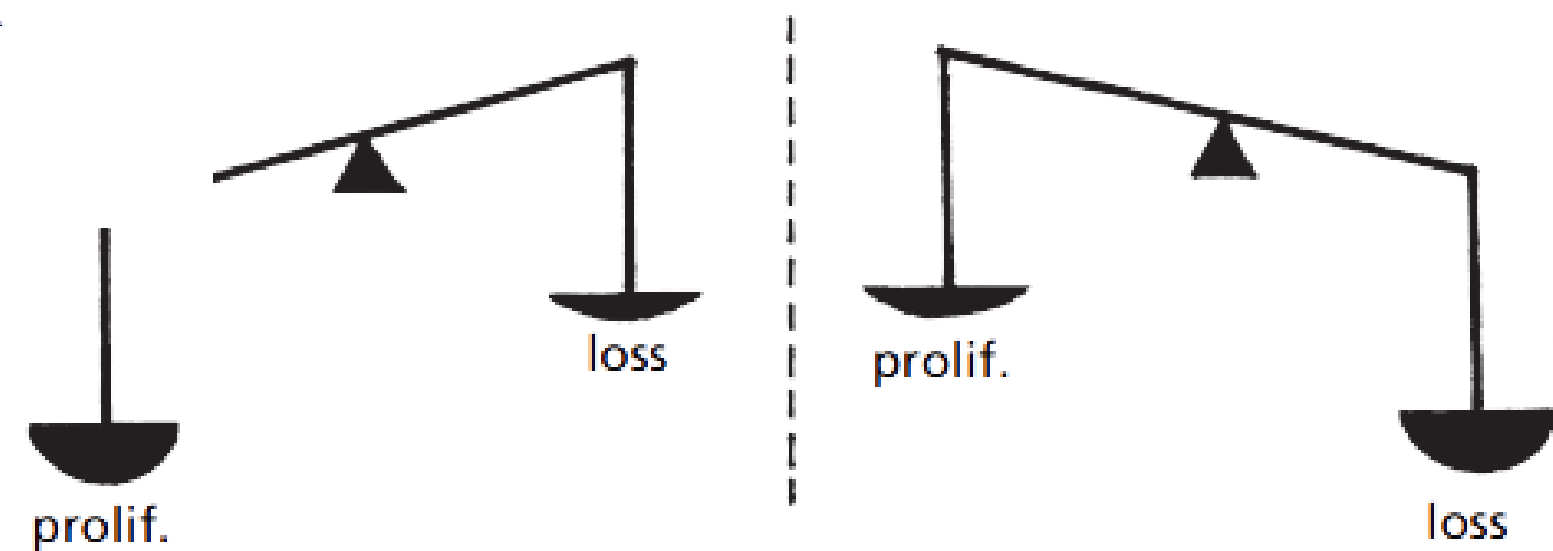
Disorders of Cellular and Tissue

The Normal Cell



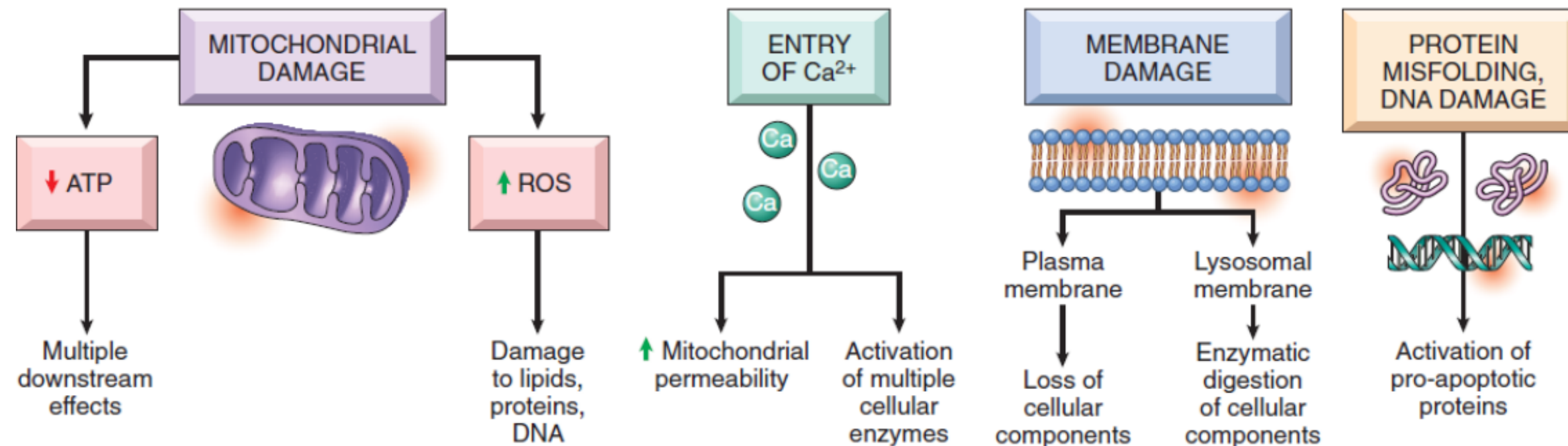
Imbalance of cell number

FI CELL



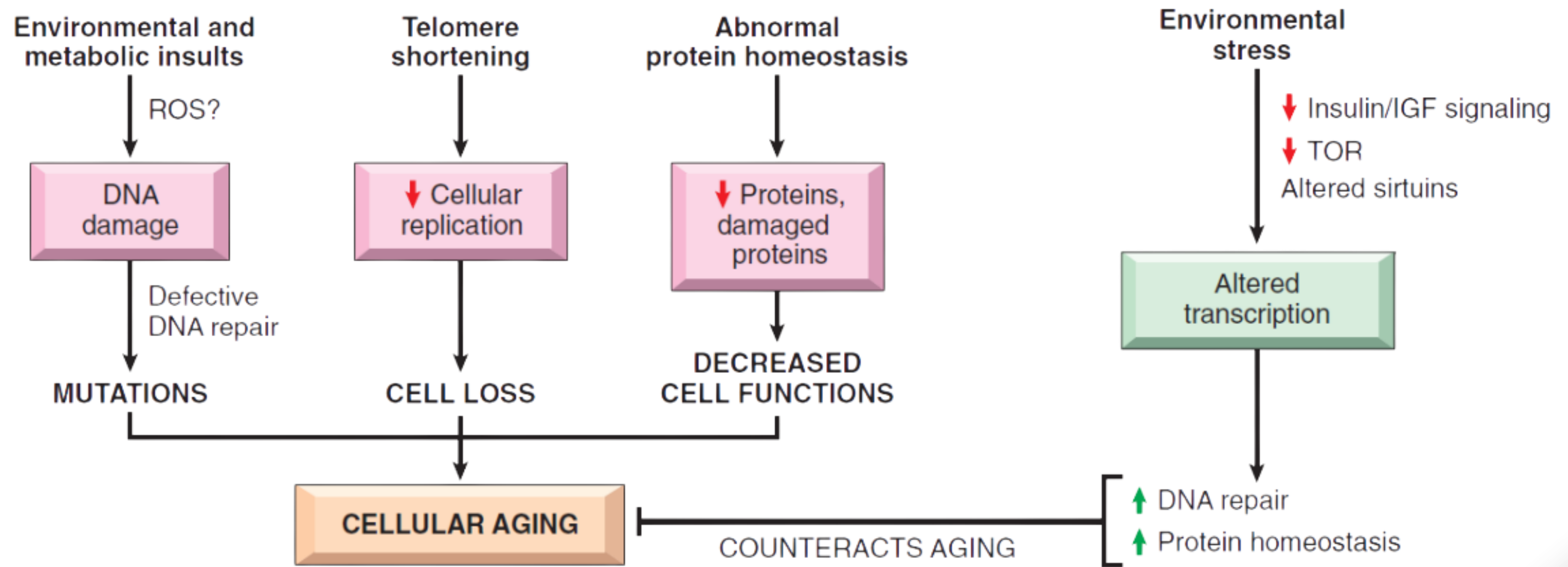
(Youn, Lee, Park & Hong, 2024)

Cell Injury



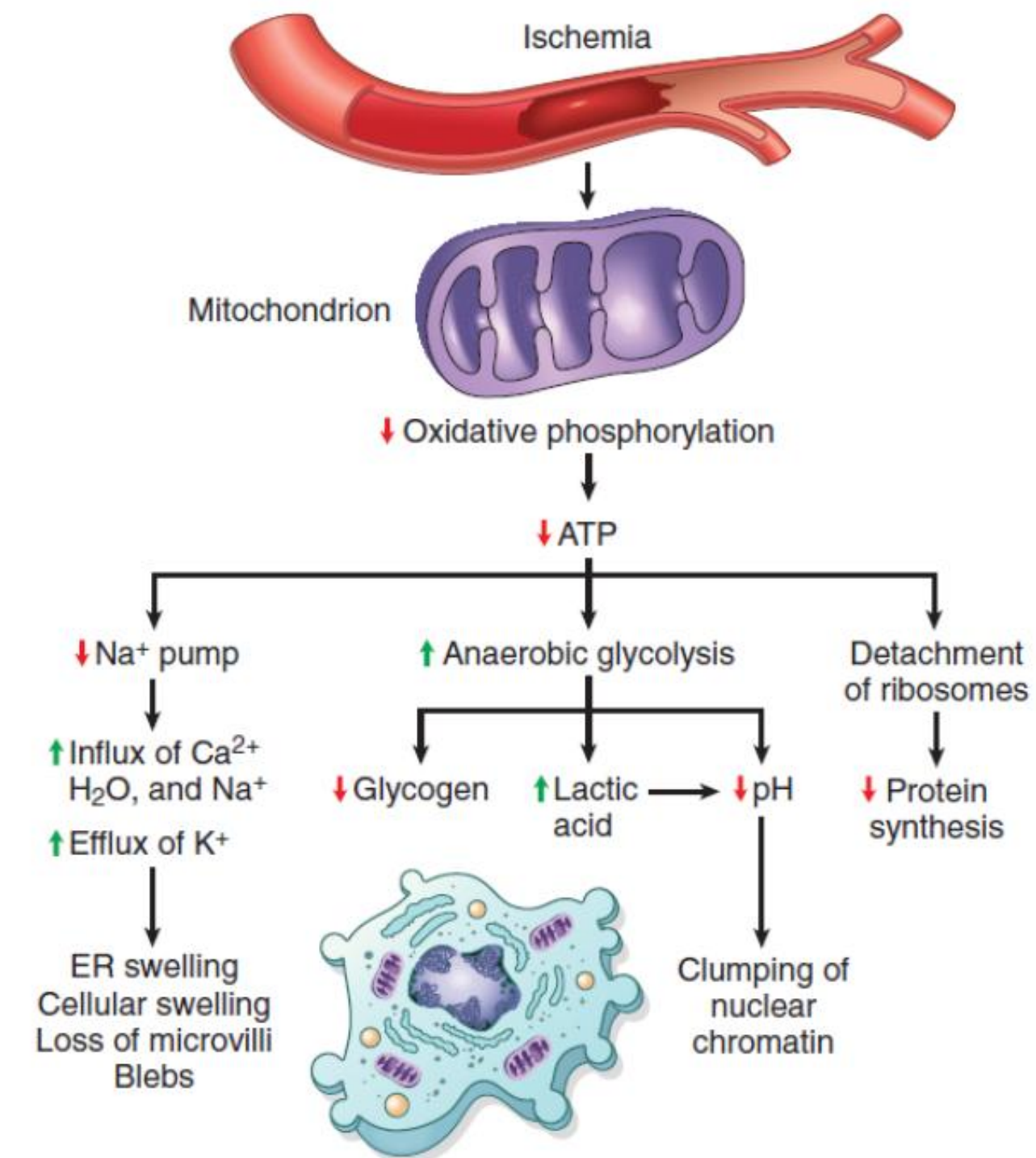
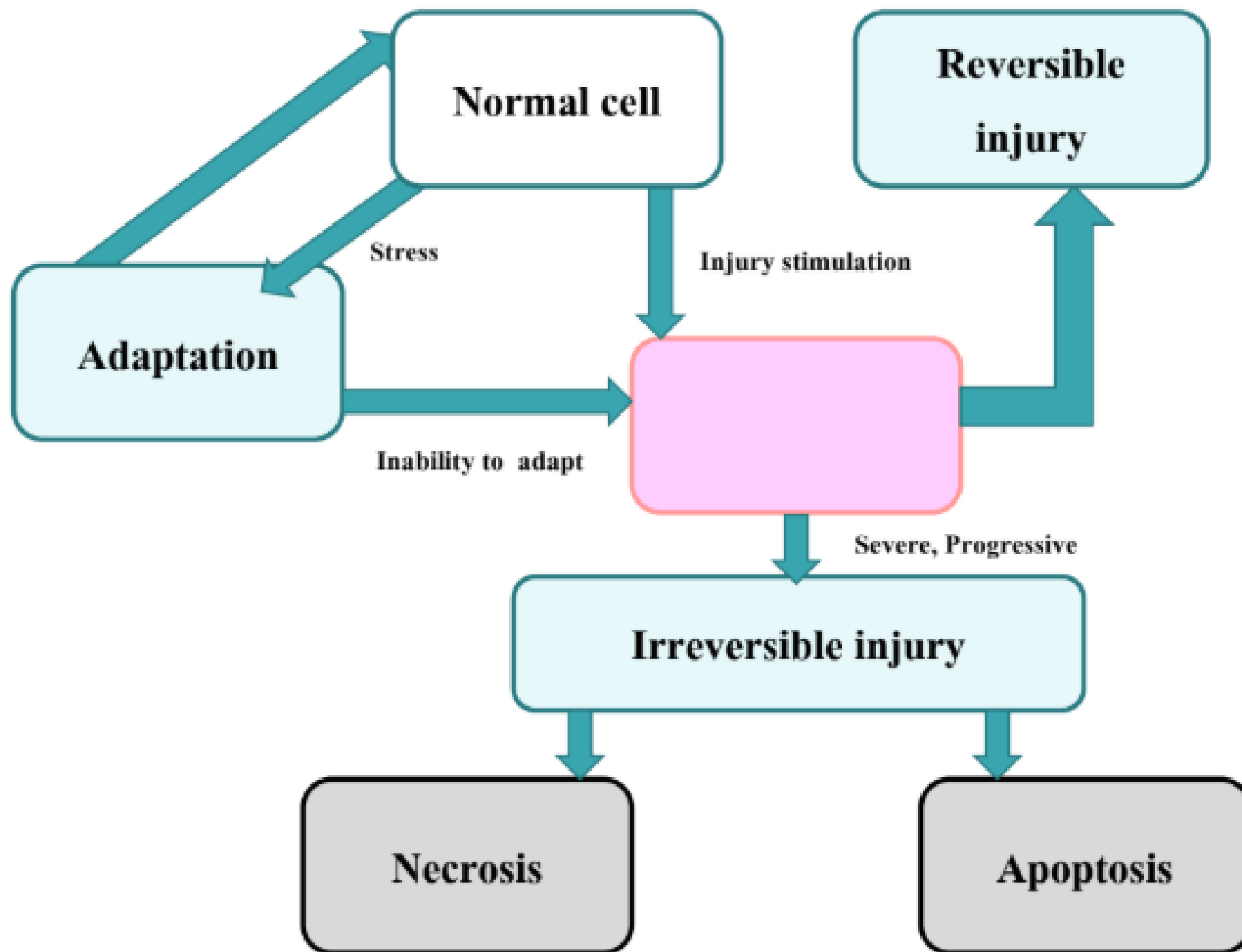
1. **Reduced oxygen supply** – respiratory disease, cardiovascular disease, anemia
2. **Physical agents** – mechanical trauma, excessive heat or cold, radiation
3. **Chemical agents**
4. **Viruses**
5. **Abnormal immunological reaction** – hypersensitivity states, glomerulonephritis
6. **Nutritional deficiencies** – vitamin deficiency and malabsorption syndromes
7. **Genetic abnormalities** – Down's syndrome.

Causes of cell Injury: Aging

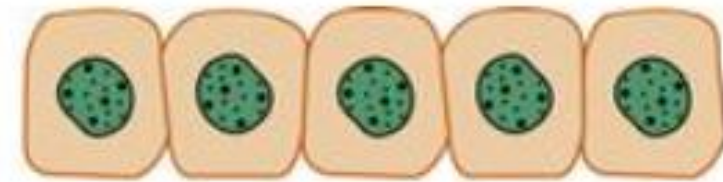


(Youn, Lee, Park & Hong, 2024)

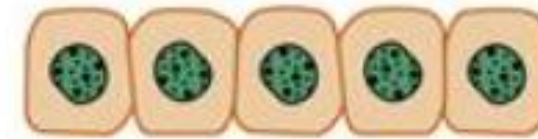
Cell Adaptation



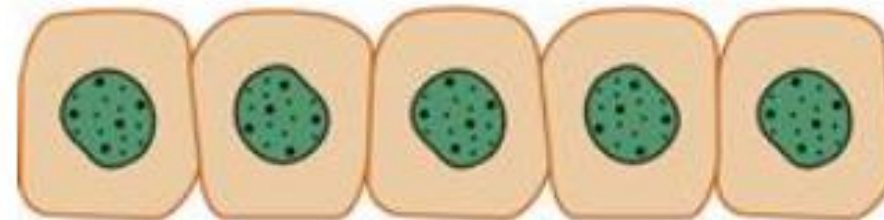
Cell Adaptation



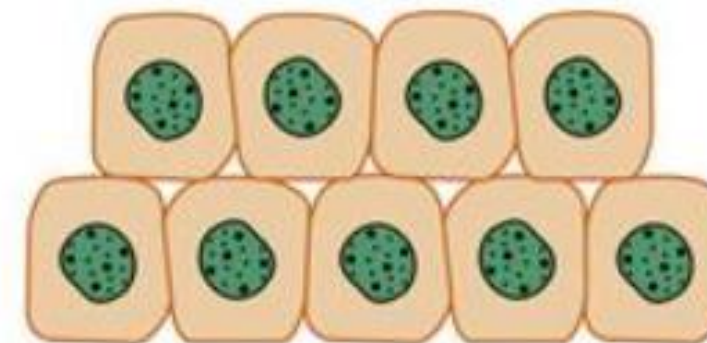
Normal



Atrophy
(decreased cell size)



Hypertrophy
(increased cell size)



Hyperplasia
(increased cell number)

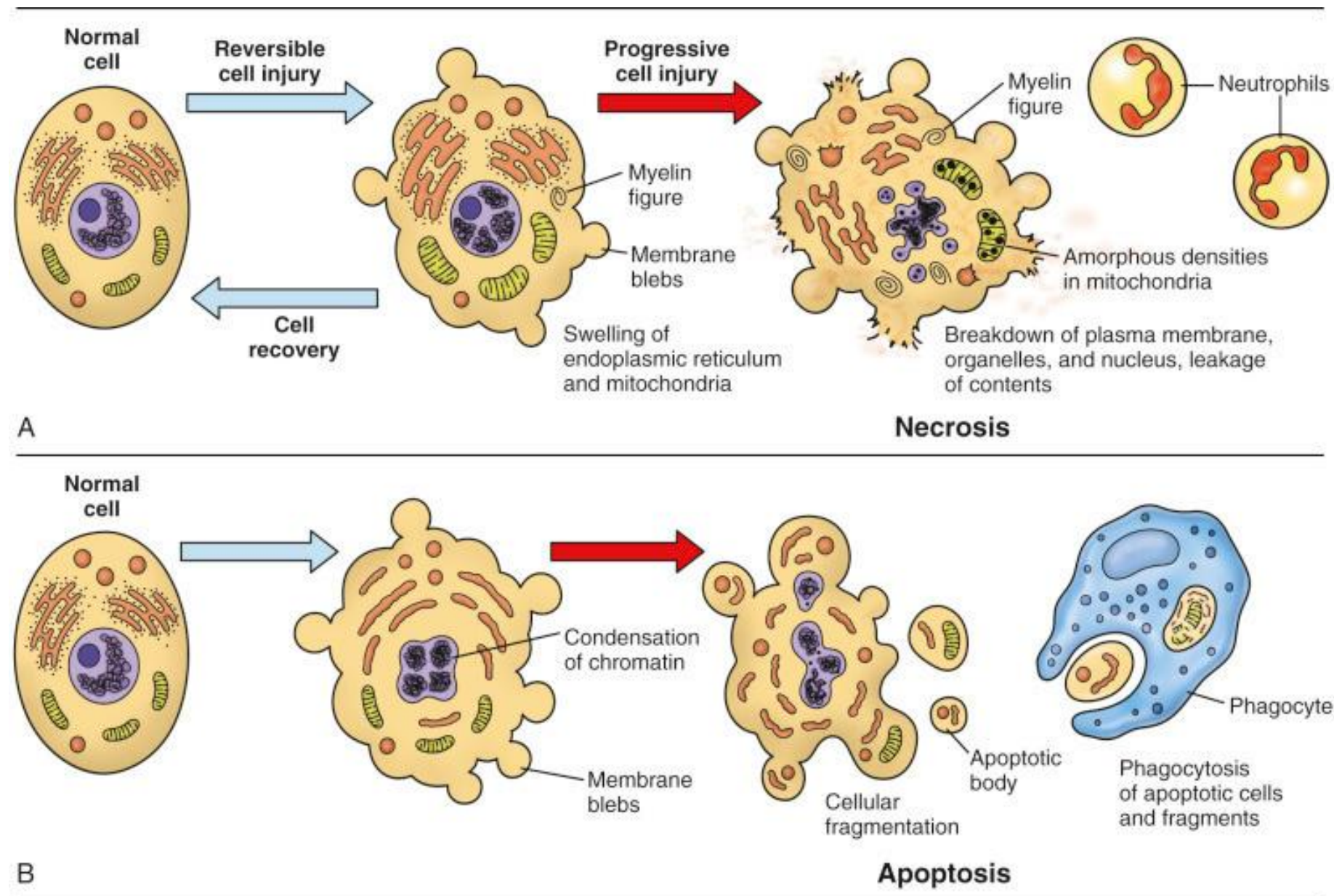


Metaplasia
(conversion of one cell
type to another)



Dysplasia
(disorderly growth)

Cell Death



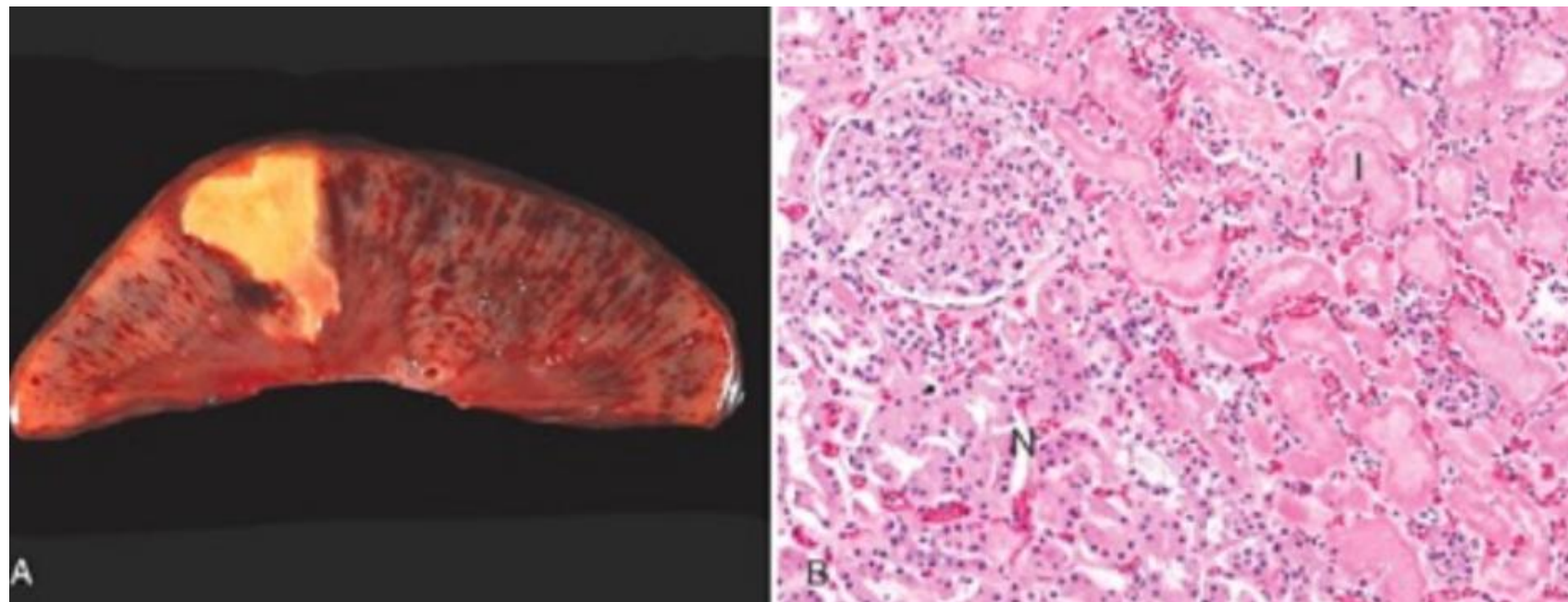
In necrosis, leakage of cell contents through the ruptured plasma membrane into the extracellular matrix elicits inflammation.

In apoptosis, cellular fragments are extruded as plasma membrane-bound apoptotic bodies that are recognized by phagocytes but do not cause inflammation

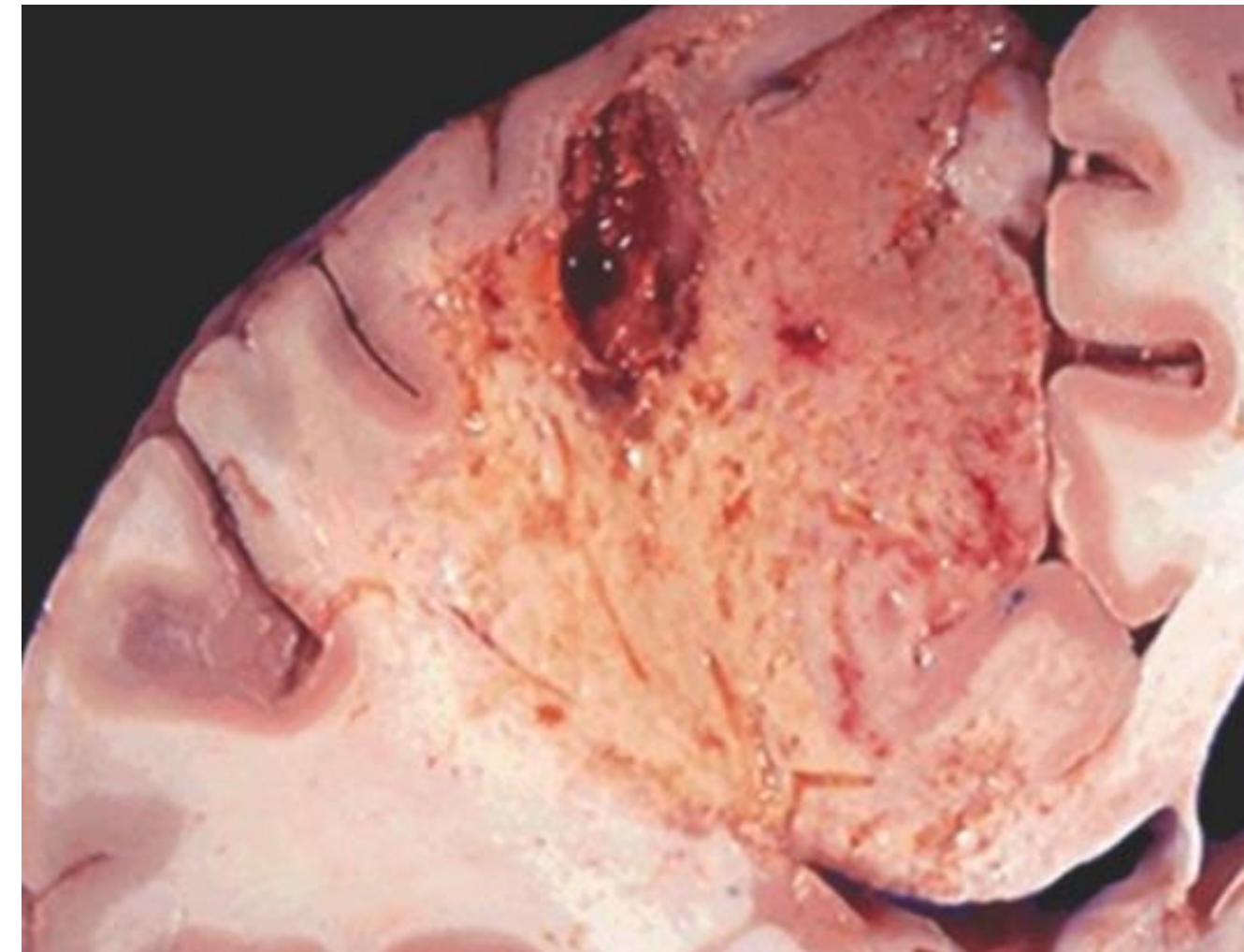
(Singh et al., 2021)

Necrosis

Coagulative necrosis

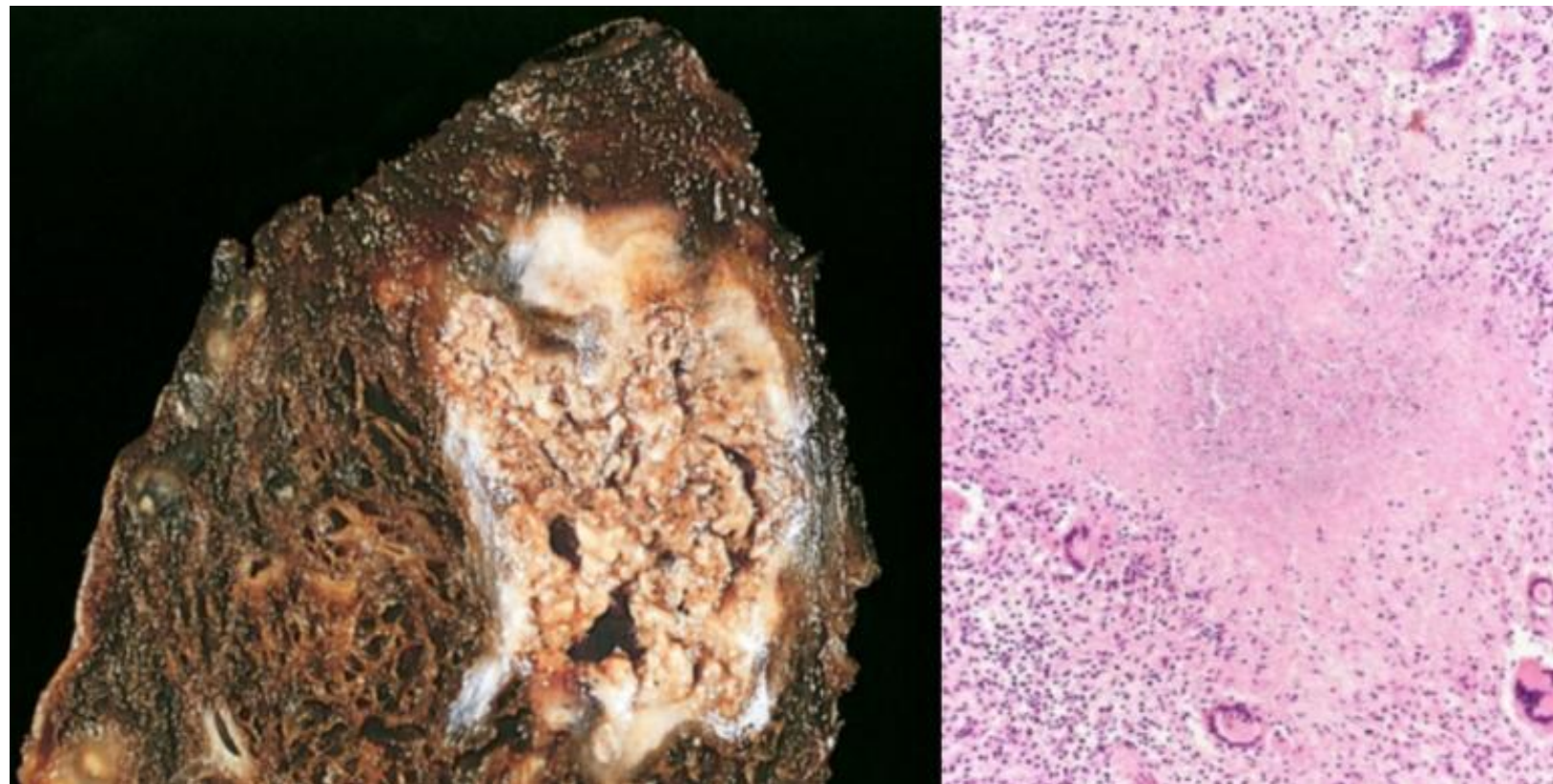


Liquefactive necrosis

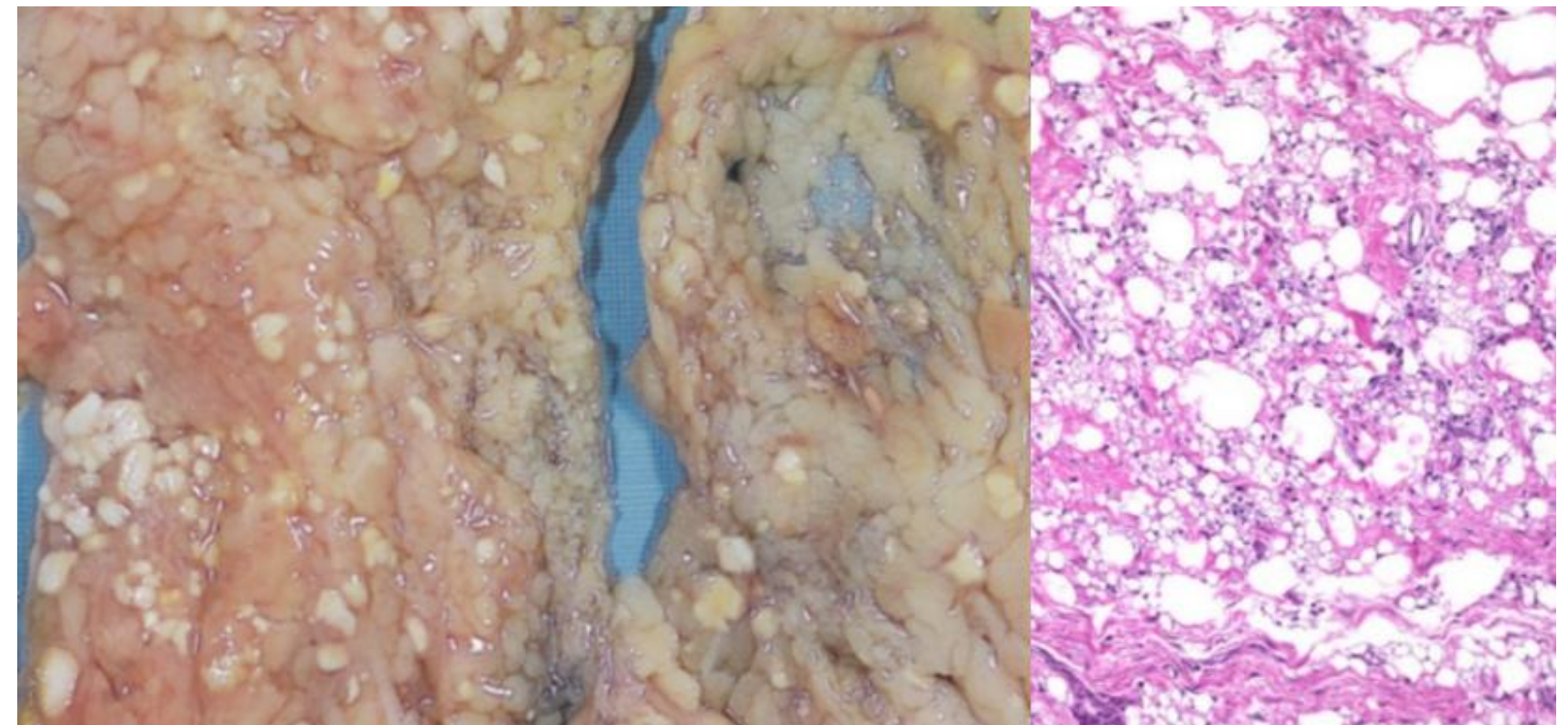


Necrosis

Caseous necrosis

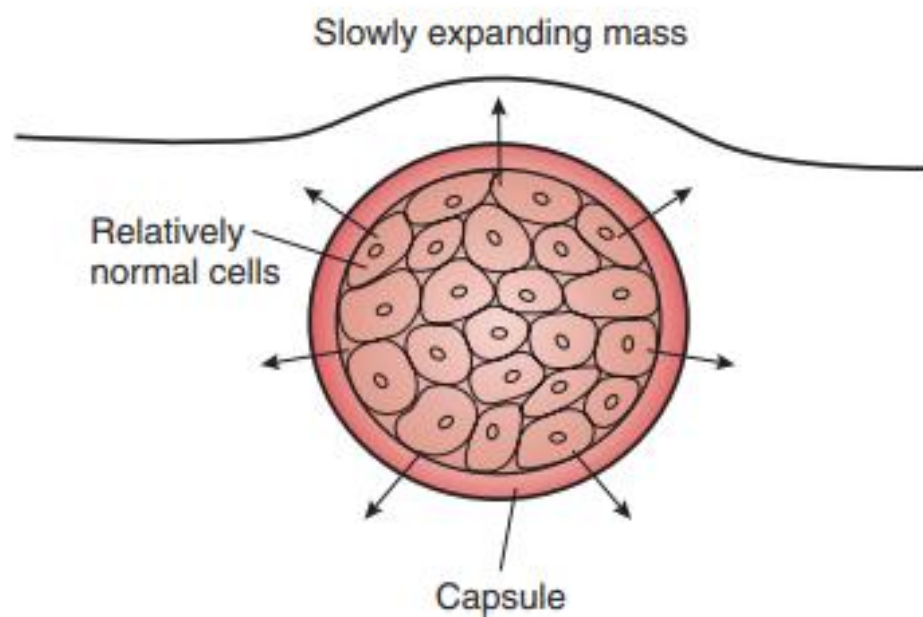


Fat necrosis

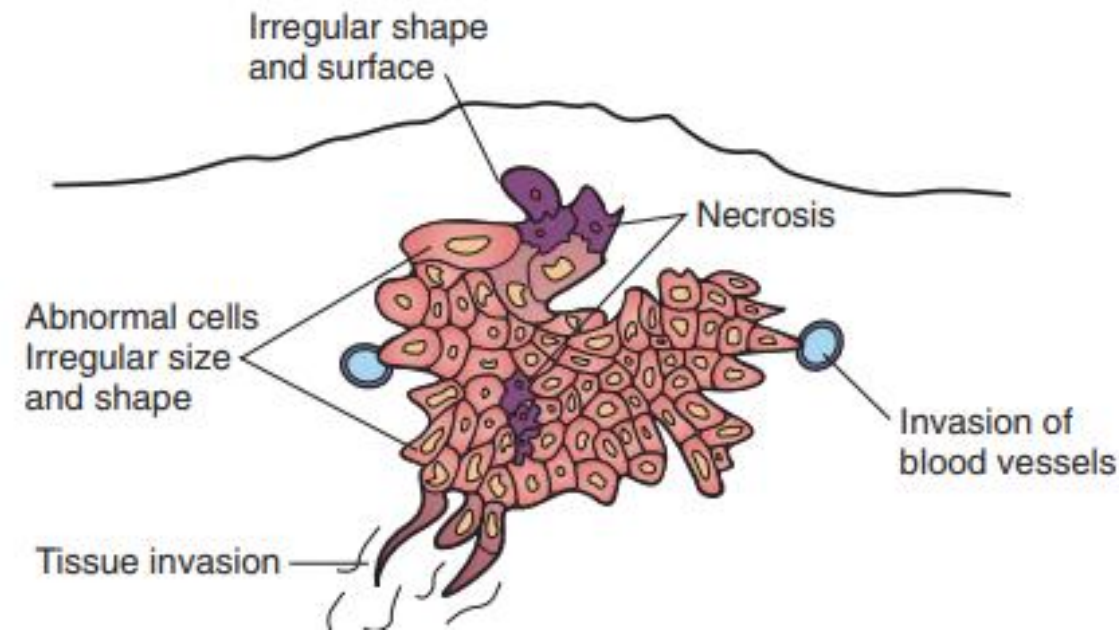


Neoplasia/Tumor/Cancer

A. Benign Tumor

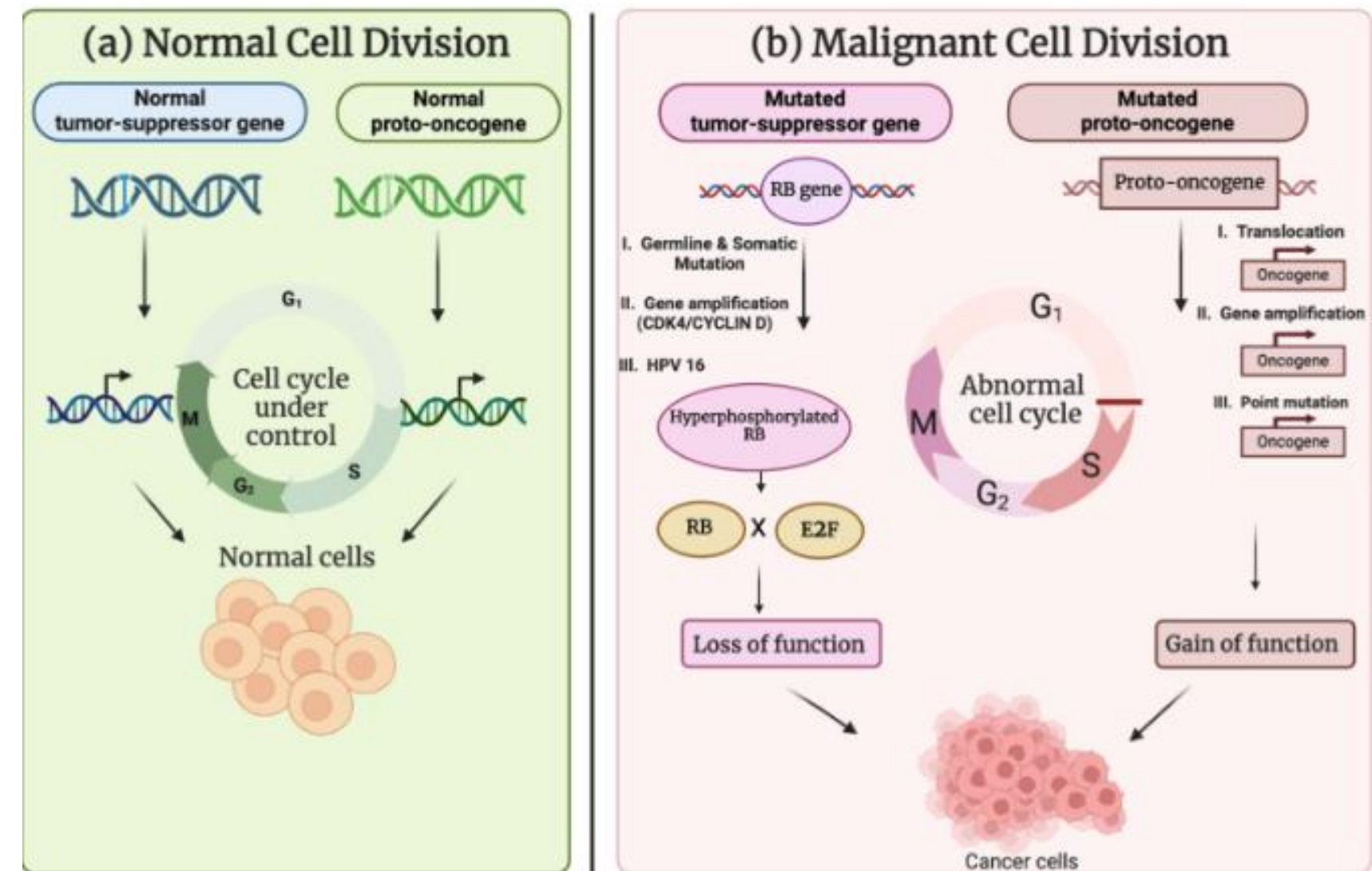
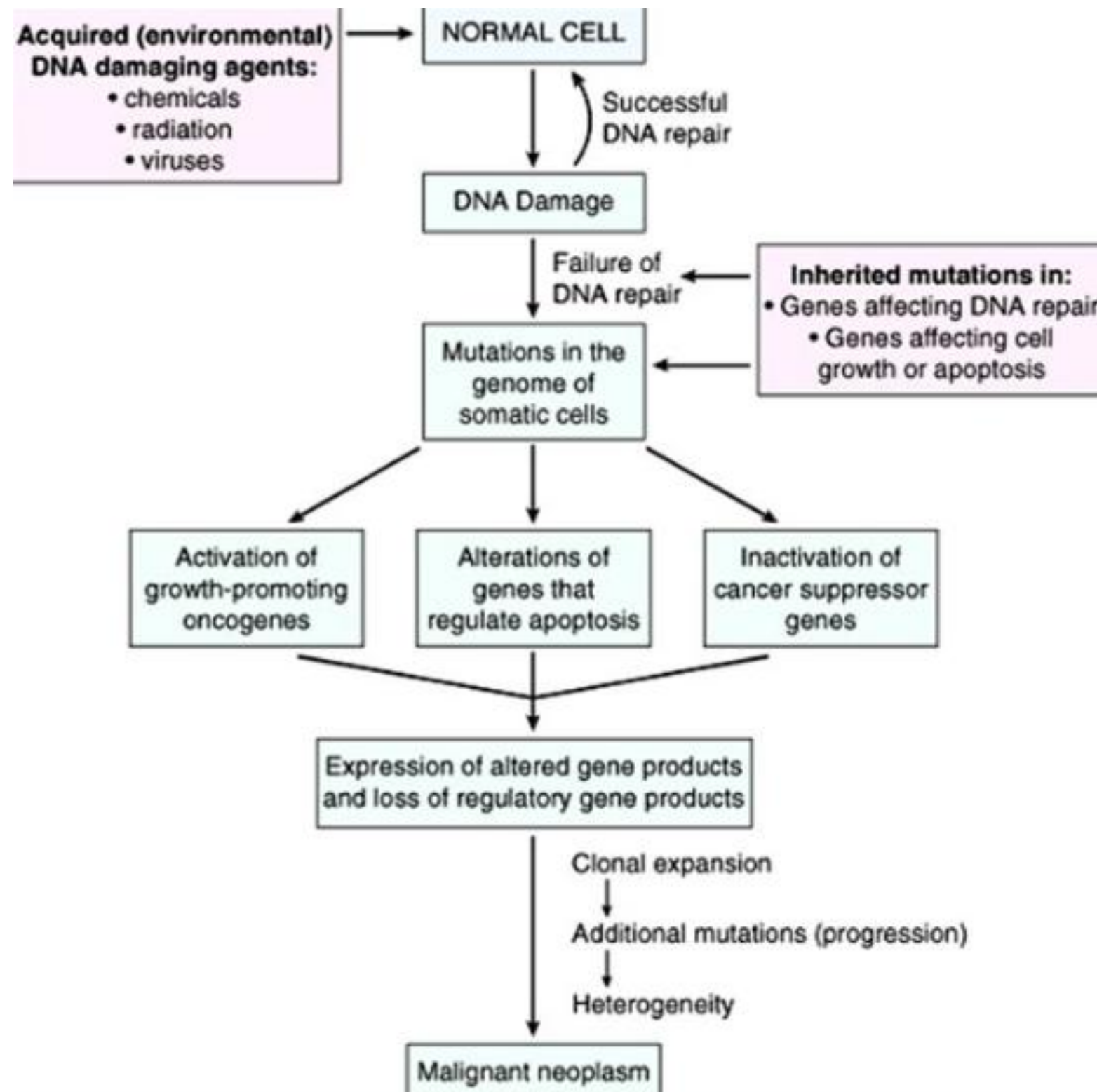


B. Malignant Tumor



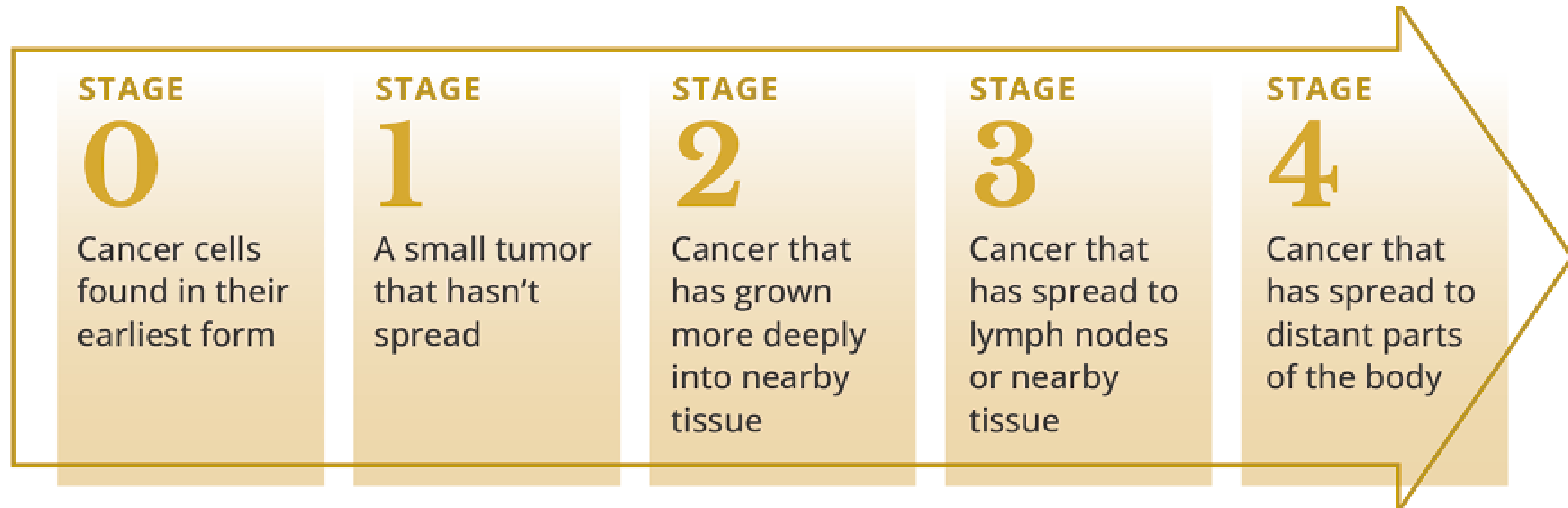
	Malignant	Benign
Unregulated	Yes	Yes
Irreversible	Yes	Yes
Ability to Invade and Metastasize	Yes	No
Differentiation	Poorly Differentiated	Well Differentiated
Speed of Growth	Fast	Slow
Recurrence after Removal	Yes	No
Cause Death	Often	Rarely

Neoplasia/Tumor/Cancer



(Singh et al., 2021)

Stage of Cancer



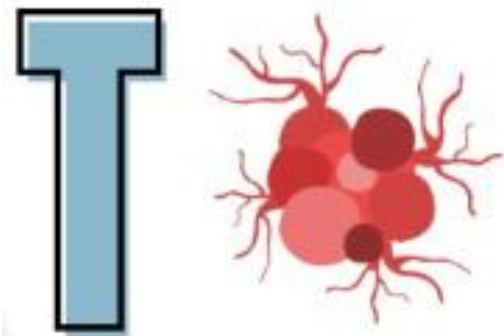
Stage 1, or early-stage or localized cancer

Stage 2, or early locally advanced cancer

Stage 3, or advanced-stage or locally advanced cancer

Stage 4, or metastatic or advanced cancer

Stage of malignant neoplasms



Size of the primary tumor

- **TX:** Main tumor cannot be measured.
- **T0:** Main tumor cannot be found.
- **T1-T4:** Refers to the size and/or extent of the main tumor. The higher the number = the larger tumor



Regional lymph node involvement

- **NX:** Cancer in nearby lymph nodes cannot be measured.
- **N0:** There is no cancer in nearby lymph nodes.
- **N1, N2, N3:** Refers to the number and location of lymph nodes that contain cancer.

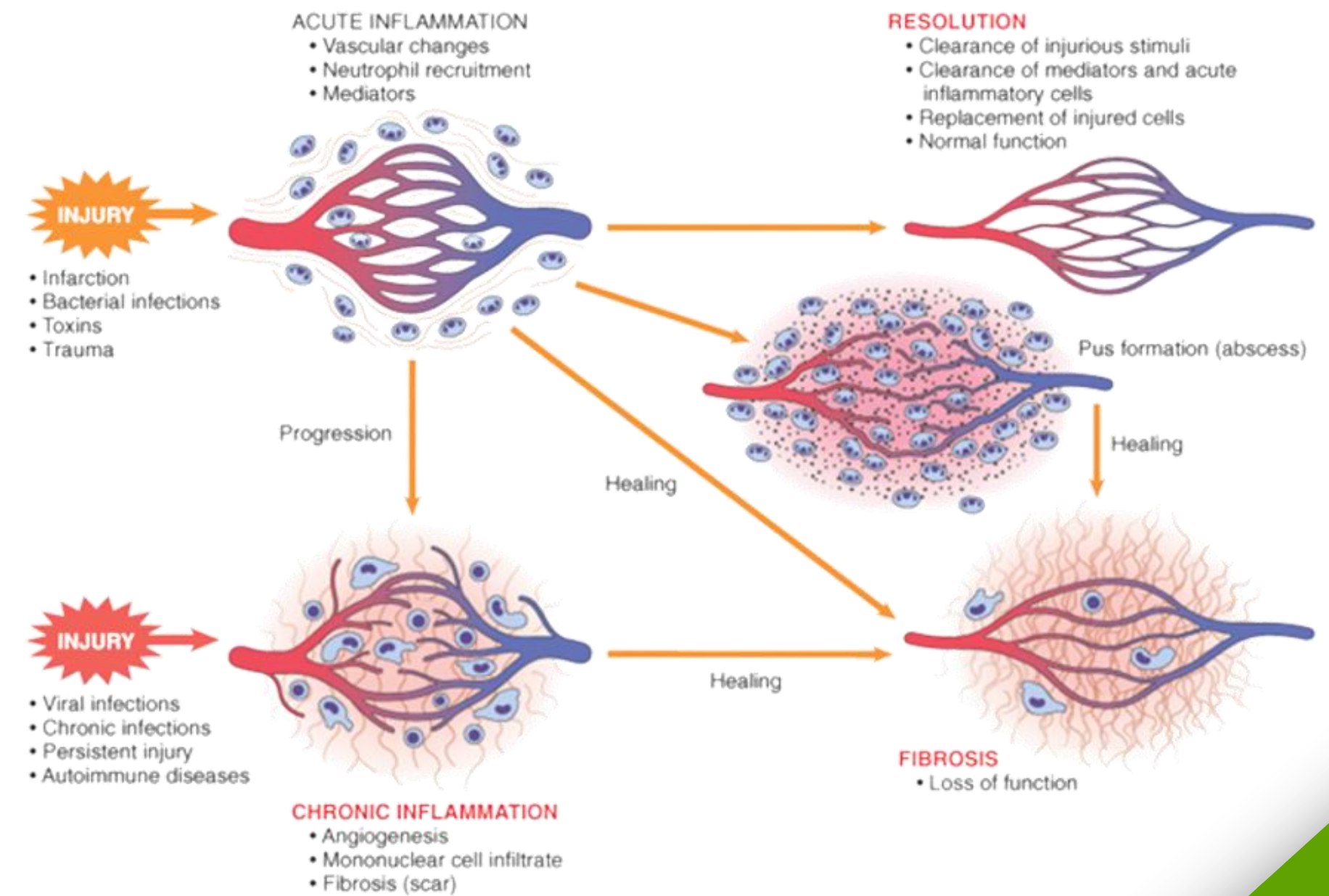
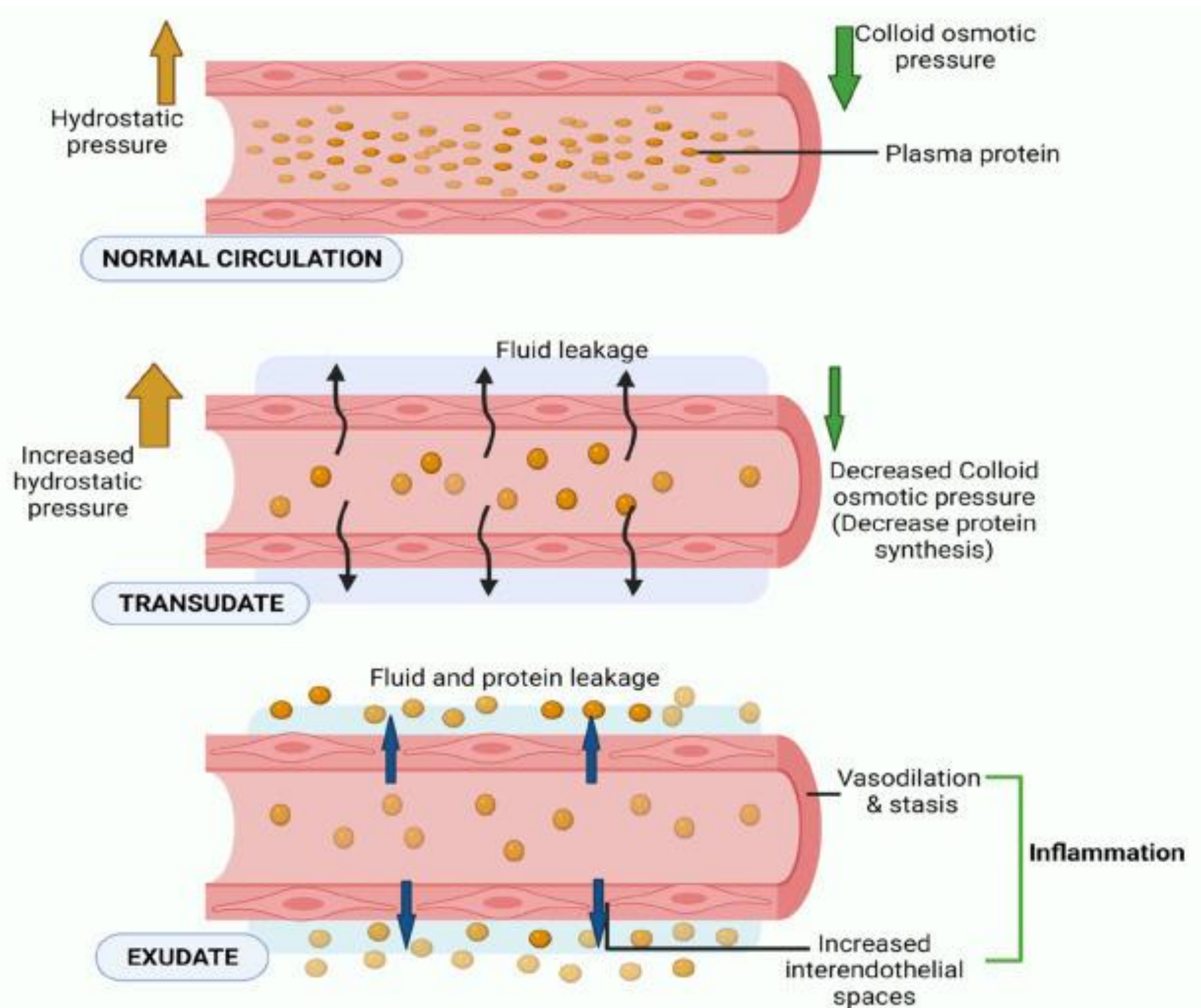


Metastasis

- **MX:** Metastasis cannot be measured.
- **M0:** Cancer has not spread to other parts of the body.
- **M1:** Cancer has spread to other parts of the body.

	Stage	TNM	L. Nodes%	5-Year Survival
Superficial	Ois	Tis		
	Oa	Ta		90%
Superficial	I	T1		
Infiltrating	II	T2	7-30	70%
	III	T3a T3b	26 50	35-50%
Invasion of adjacent structures	III	T4a		
	IV	T4b	70	
Lymph node invasion	IV	N+	100	10-20%
Distant extension	IV	M+	100 60	
		M+		

Inflammation



Inflammation

Inflammatory Cascade: *Pathogenesis and clinical findings*

Note: The Inflammatory Cascade is a non-specific response to all foreign pathogens and trauma.

Abbreviations:

ILs: Interleukins

WBC's: White Blood Cells

Authors:

Heather Yong

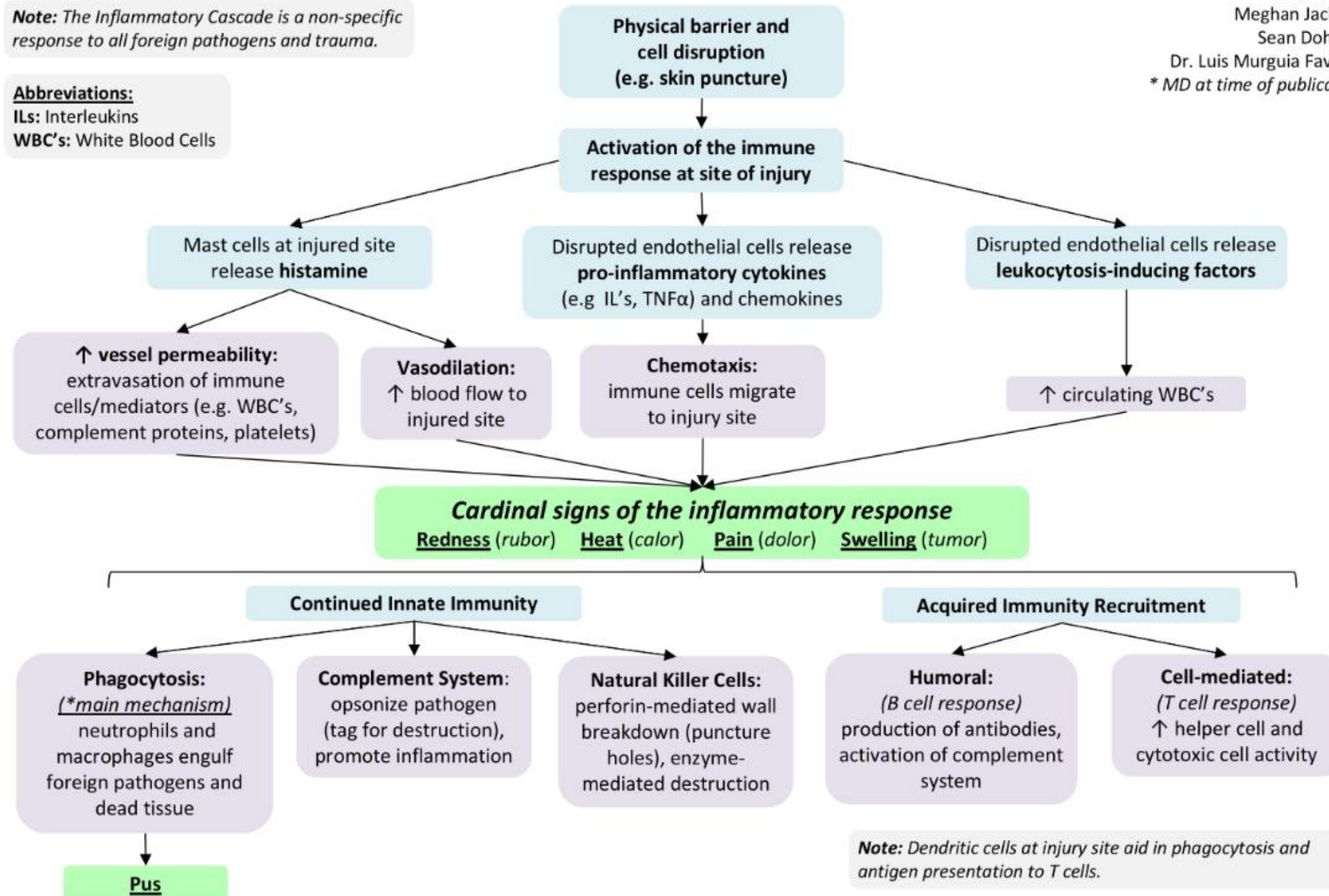
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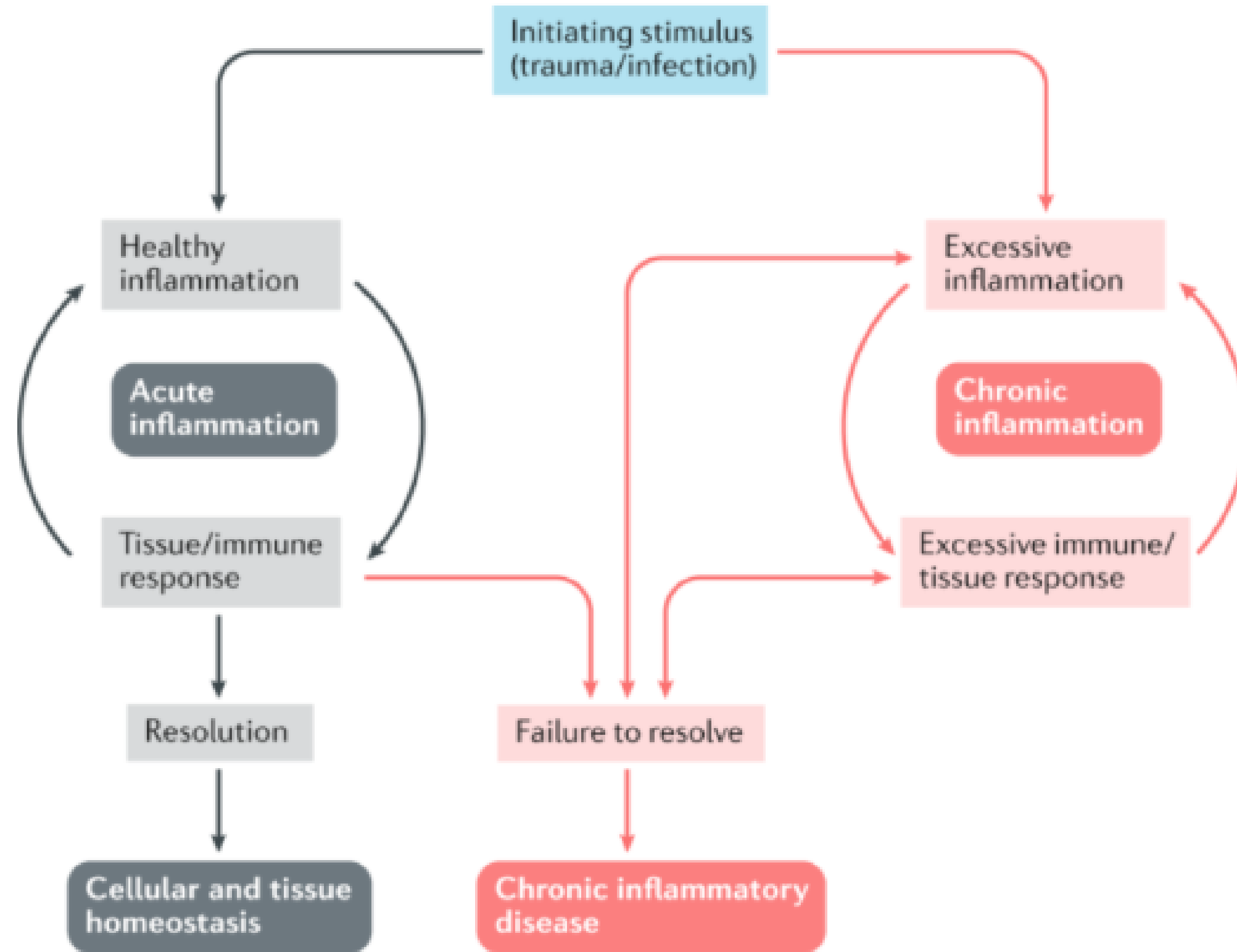
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Dr. Luis Murguia Favela*

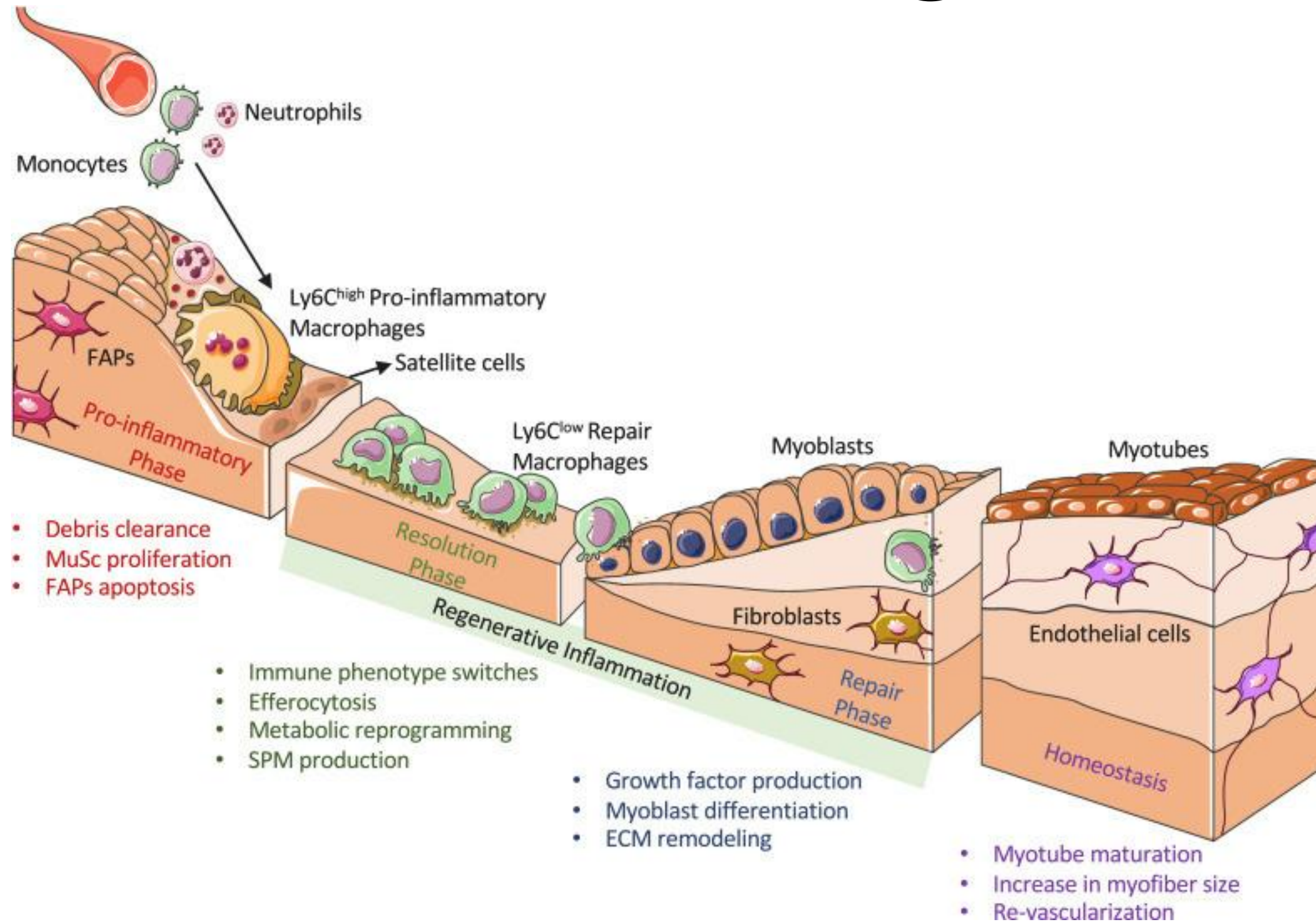
* MD at time of publication



Acute and chronic Inflammation



Tissue healing



(Tang et al., 2021)

The process of returning to competition following injury

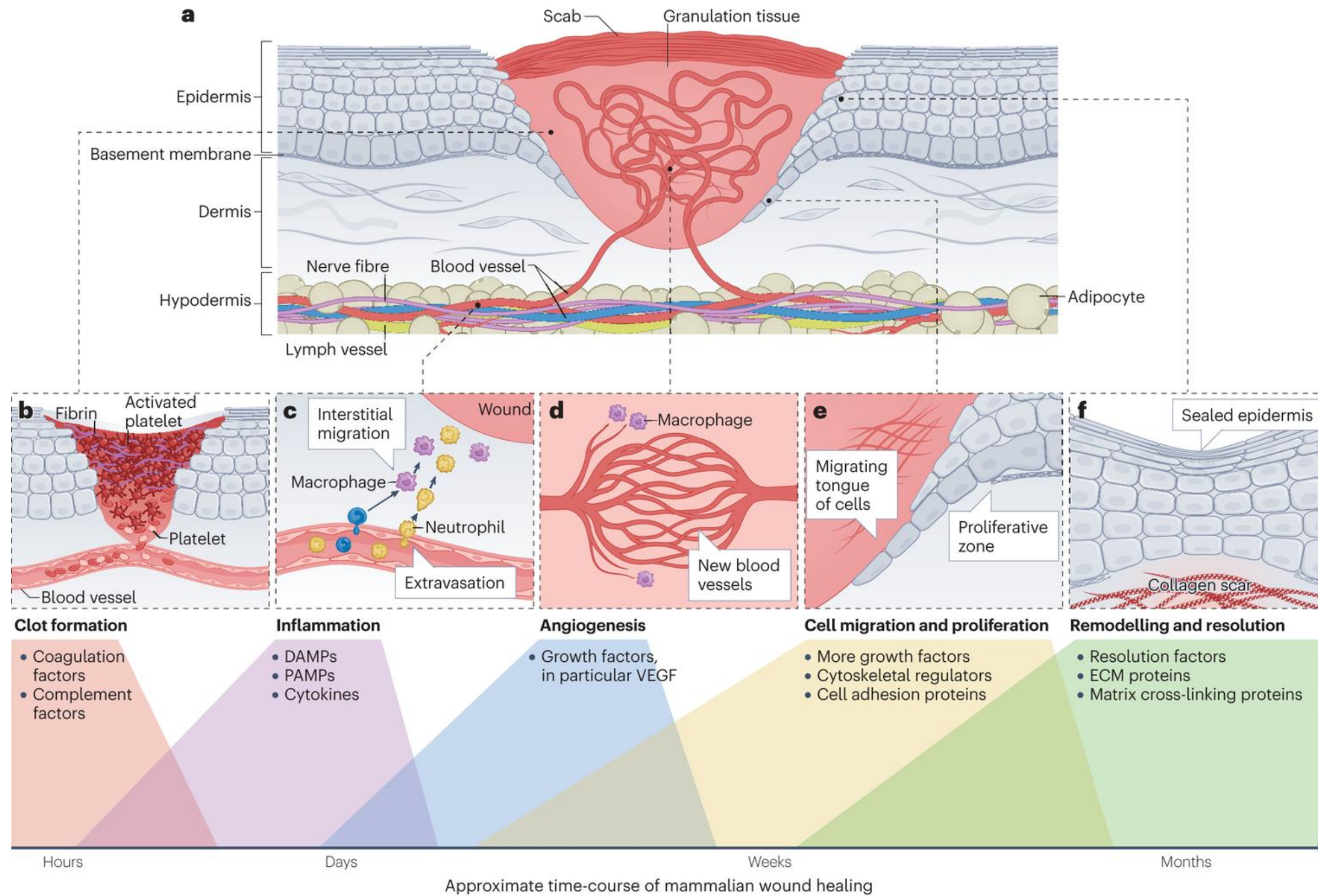


Inflammatory response phase	Pain, swelling, and redness
↓	Decreased collagen synthesis
	Increased number of inflammatory cells
Fibroblastic repair phase	Collagen fiber production
↓	Decreased collagen fiber organization
	Decreased number of inflammatory cells
Maturation–remodeling phase	Proper collagen fiber alignment
	Increased tissue strength



(Peña & Martin, 2024)

Tissue healing



(Tang et al., 2021)

Case study

Mr. Sakchai, a **72-year-old** retired teacher, presents to the outpatient clinic with complaints of **progressive weight loss (6 kg in 3 months)**, chronic **fatigue**, and a persistent **cough with occasional blood-streaked** sputum. He has a history of **hypertension and type 2 diabetes**, both controlled with medication. He **smoked** 1 pack per day for 40 years but quit 10 years ago. Physical examination reveals **decreased breath sounds in the right upper lobe**. A chest X-ray shows a **mass lesion in the right lung**. Biopsy confirms non-small cell lung carcinoma (**NSCLC**).





Question

1. What are the age-related physiological changes that may predispose older adults to cancer?
2. Explain the pathophysiology of lung cancer development in this patient.
3. Discuss how comorbidities (hypertension and diabetes) may influence cancer treatment and prognosis.
4. What are common clinical manifestations of lung cancer in older adults?

Answer



- 1 **Age-related physiological changes:** Decline in DNA repair mechanisms. Accumulation of genetic mutations over time. Decreased apoptosis of abnormal cells. Weakened immune surveillance (immunosenescence).
- 2 **Pathophysiology of lung cancer:** Chronic exposure to carcinogens (e.g., tobacco smoke) → DNA mutations in epithelial cells of the bronchial lining. Activation of oncogenes and inactivation of tumor suppressor genes. Uncontrolled proliferation → formation of a malignant tumor. Local invasion and potential metastasis (to brain, bone, liver).

Answer



LUNG CANCER: CLINICAL FINDINGS AND PARANEOPLASTIC SYNDROMES

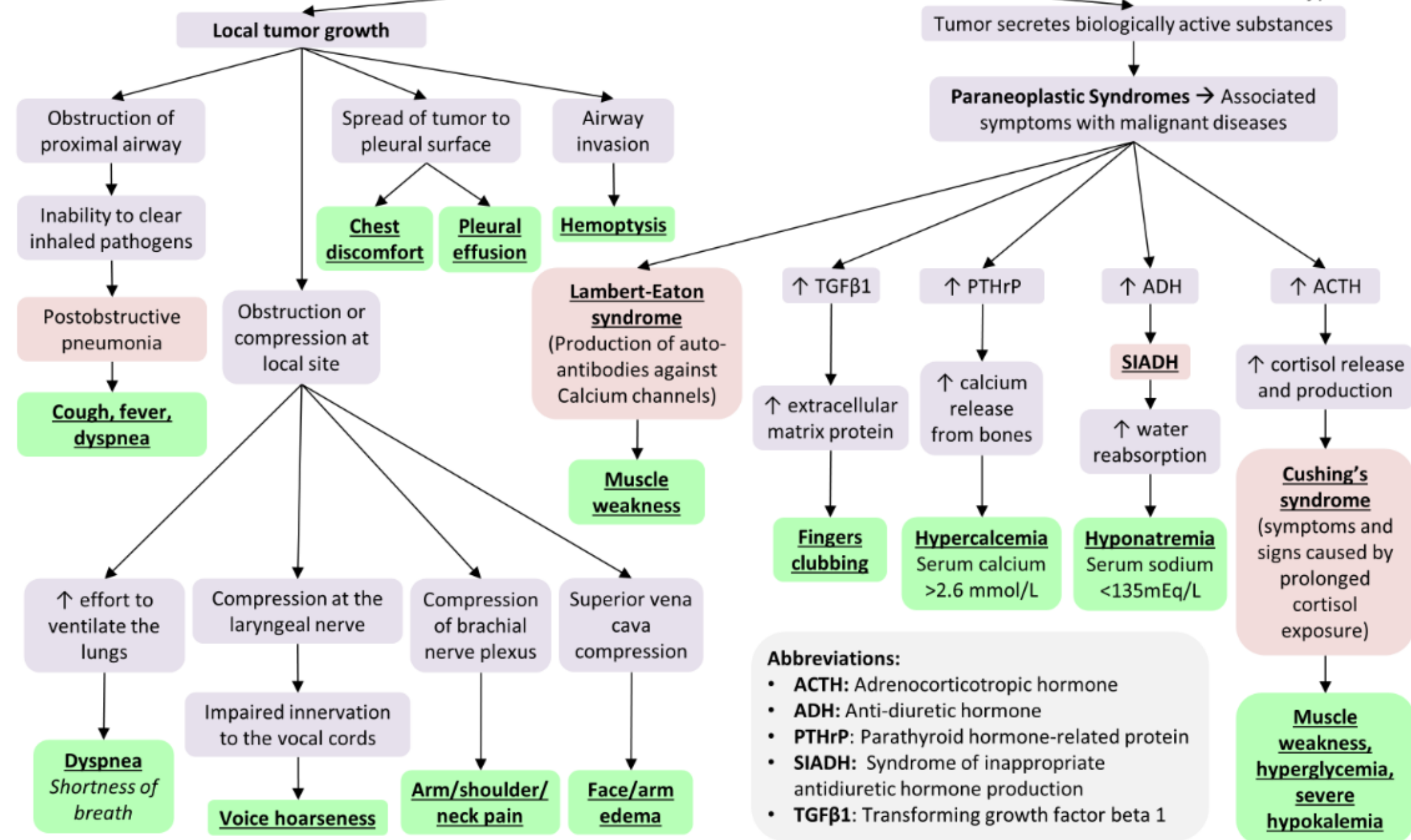
Lung cancer: *clinical findings and paraneoplastic syndromes*

Note: most presentations of lung cancer are very subtle with non-specific symptoms and signs (i.e. fever, weight loss, general malaise)

Uncontrolled abnormal cell growth in one or both lungs → **Lung Cancer**

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Answer



3

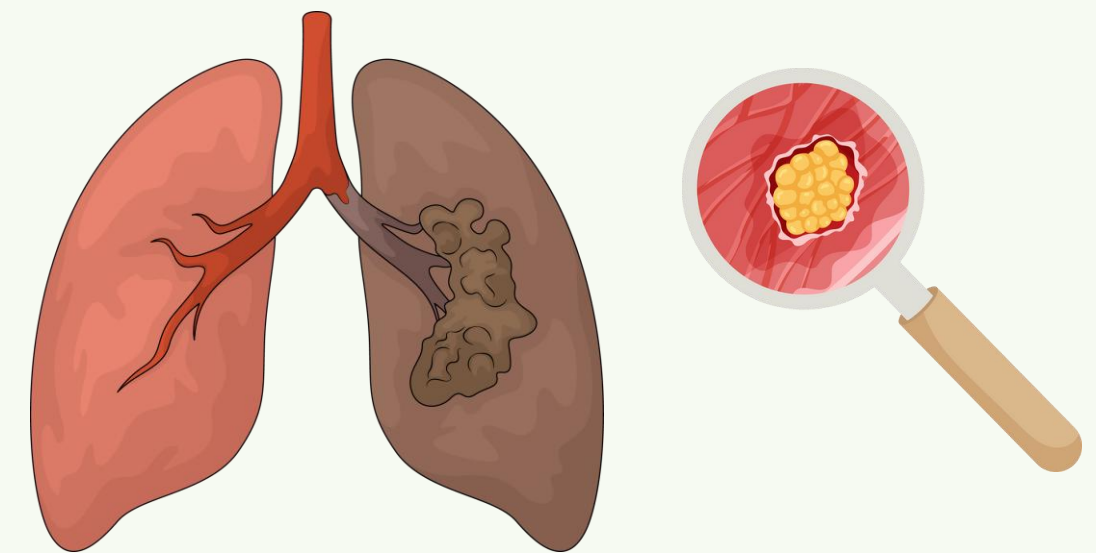
Comorbidities impact:

Hypertension and diabetes may increase perioperative risk.
Some cancer therapies (e.g., chemotherapy, targeted drugs) may worsen cardiovascular/metabolic conditions.
Frailty and polypharmacy complicate treatment tolerance.

4

Clinical manifestations of lung cancer:

- Chronic cough, hemoptysis, dyspnea.
- Weight loss, anorexia, fatigue.
- Local chest pain, hoarseness.





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