Approach to Non-neoplastic lung disease, especially ILD

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Course Description

5 part primer on the C-R-P approach to the diagnosis of “interstitial lung disease”, (or “ILD”).

Intended audience:

Pulmonologists, Radiologists, and Pathologists (and their trainees)

Course Description

Part 1: Introduction to Domains and Patterns in ILD: Focus on acute disease

Part 2: Additional patterns of lung fibrosis and inflammatory infiltrates in ILD.

Part 3: Diffuse lung disease with granulomatous features.

Part 4: ILD with airway-centering and bronchiolitis.

Part 5: Non-neoplastic lung disease potpourri

Non-neoplastic Lung Pathology I

Introduction to critical Domains (Clinical, Radiological, Histopathological, Specific diseases)

Basic patterns of lung injury and repair.

KO LESLIE MD

COMMENTARY: TV COLBY MD

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Format:

Case Presentation

Introduction to DOMAINS

Acute injury—Prototype: Diffuse Alveolar Damage (DAD)

Subacute injury—Prototype: Organizing pneumonia (OP)

Chronic injury—Prototype: Pulmonary fibrosis (including UIP as seen in IPF)

Common causes of Acute Lung Injury (ALI)

To be discussed:

Typical evolution of acute lung injury

How pulmonary fibrosis occurs

Morphologic patterns: DAD, OP, Pulmonary fibrosis

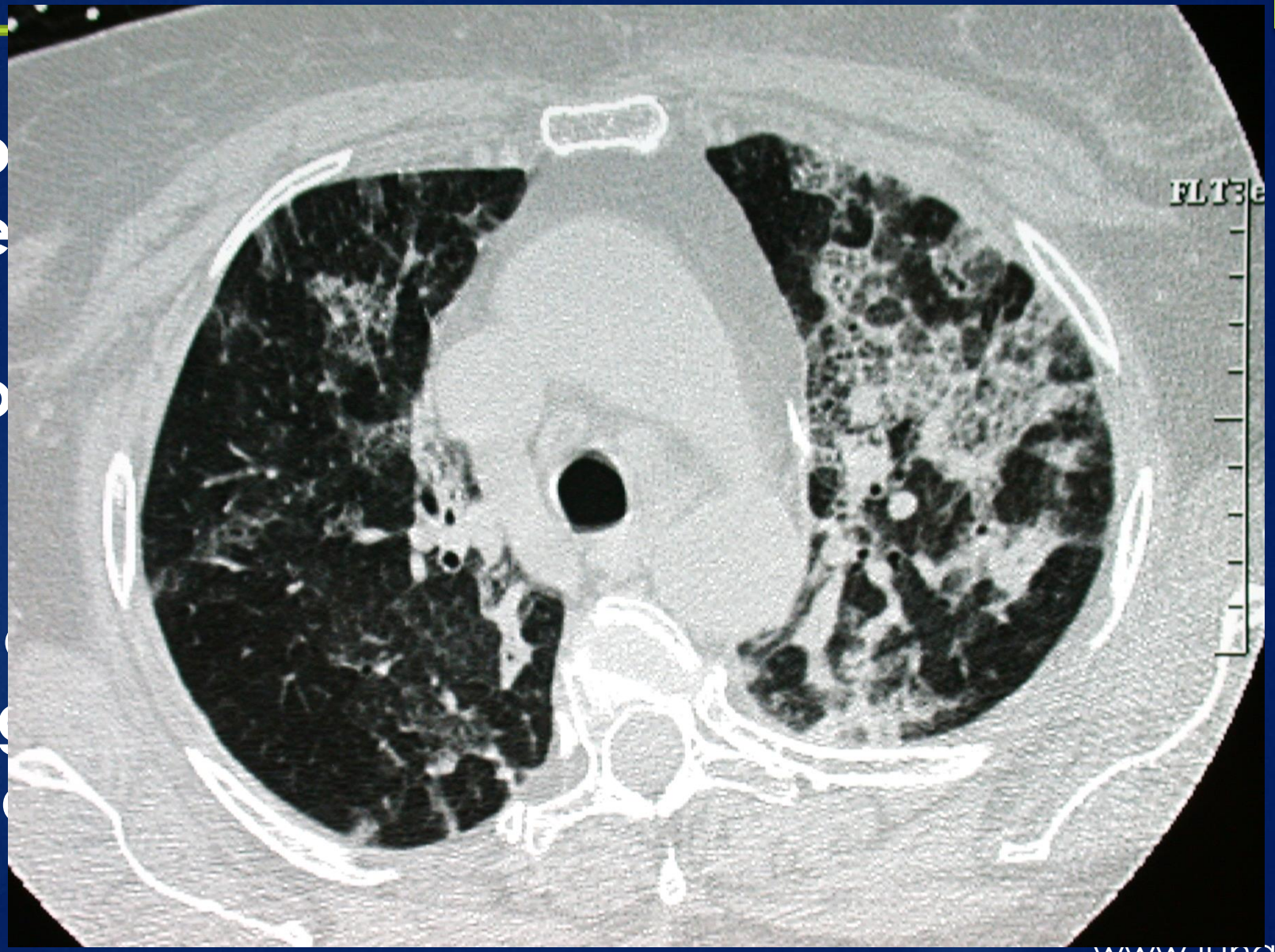
How different biopsy techniques influence diagnosis

Clinical Case

A 46 year o
progressive

Chest radio
infiltrates.

All evaluati
patient prog
hopes of id



…and the SLB shows

Clinical Case (continued)

Follow up: Query of the family reveals undiagnosed inflammatory arthritis.

All special stains and cultures from the biopsy are negative.

Serological studies reveal a positive ANA and JO-1 consistent with amyopathic polymyositis and the anti-synthetase syndrome.

Case Analysis

Four Domains

Clinical/lab presentation

Radiologic findings

Pathologic injury pattern

Disease entity that fits

Rapidly progressive dyspnea, arthritis, JO-1

Bilateral ground glass infiltrates

Acute injury with hyaline membranes = Diffuse alveolar damage --with DDX

Antisynthetase syndrome with DAD

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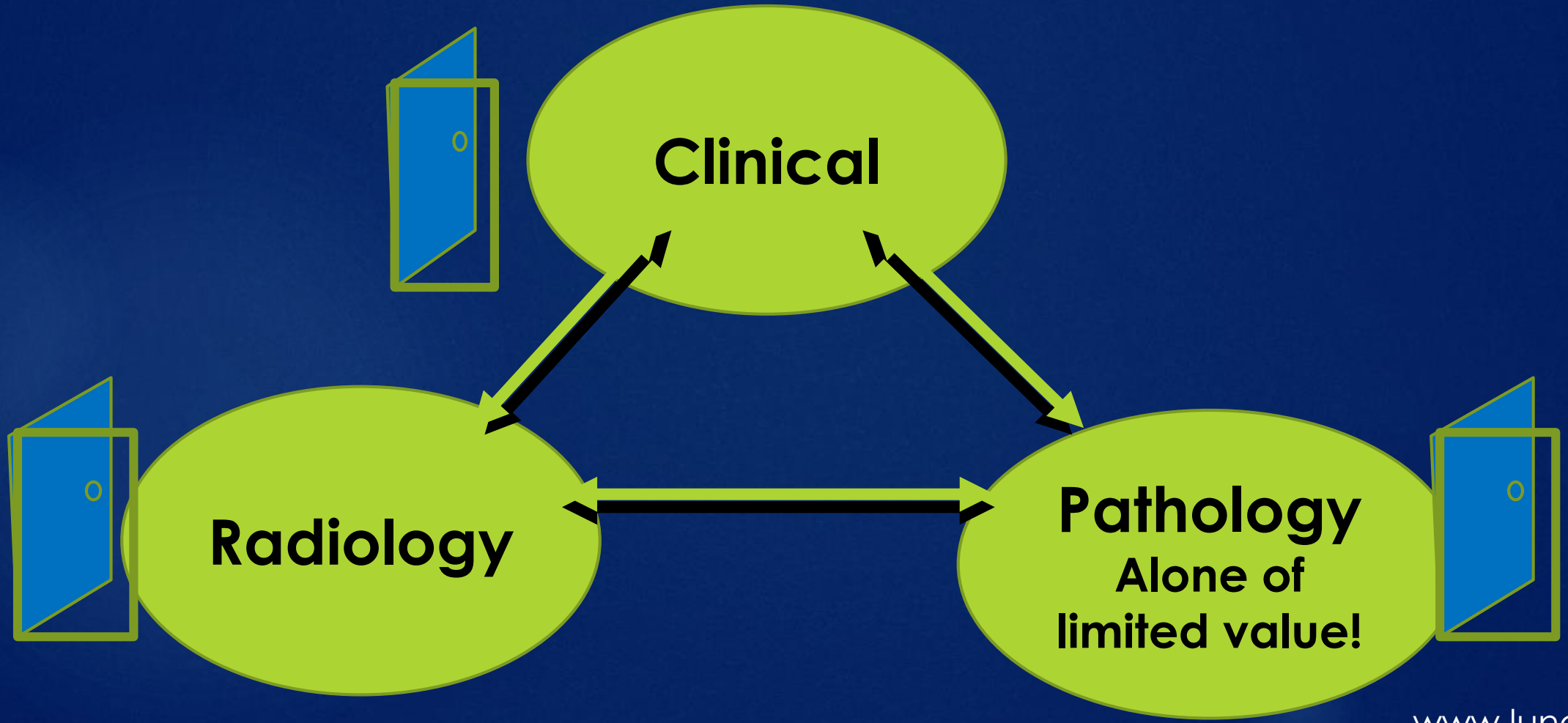
Clinical Case

Urgent therapy implemented (high dose solumedrol with pulse-dose cyclophosphamide).

Patient recovered.

Commentary

Importance of Clinical-Radiological-Pathological Correlation in ILD



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Know the question being asked!

1. Is this a disease with a defined diagnosis and proscribed therapy (like infection or sarcoid)?

2. If not specific, does the p
mechanism of injury (e.g. Ir
Immunologic?)

3. If not specific, is this a po
condition with available tre

Bronchodilators
Immunoglobulin therapy
Antibiotics
Anti-inflammatory agents
Anti-fibrotic agents
Whole lung lavage
Lung transplant

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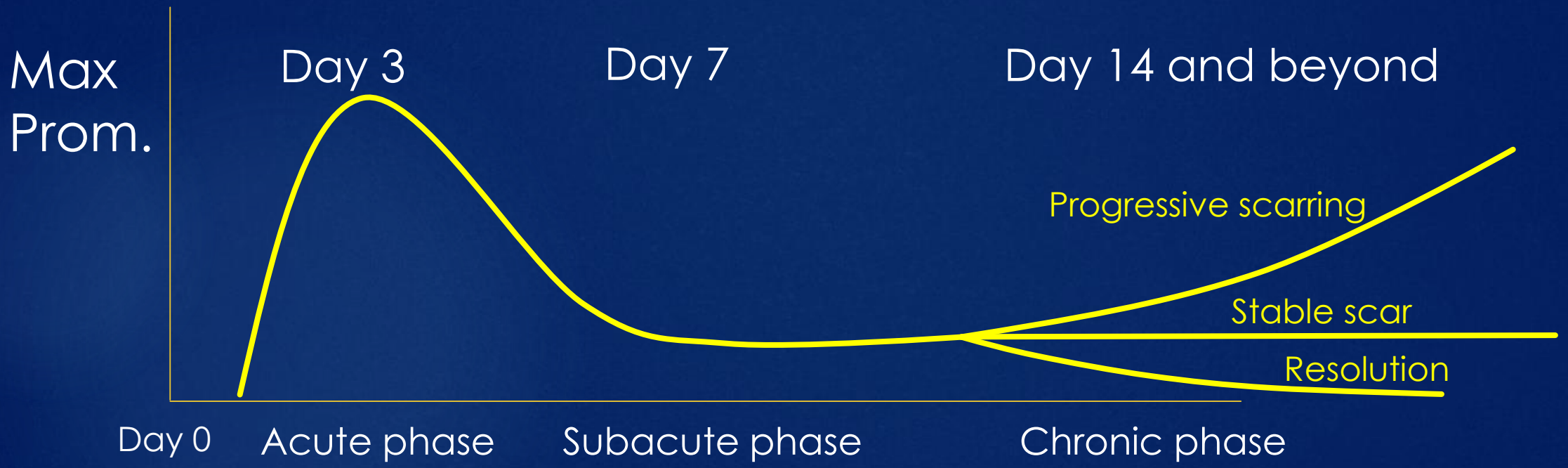
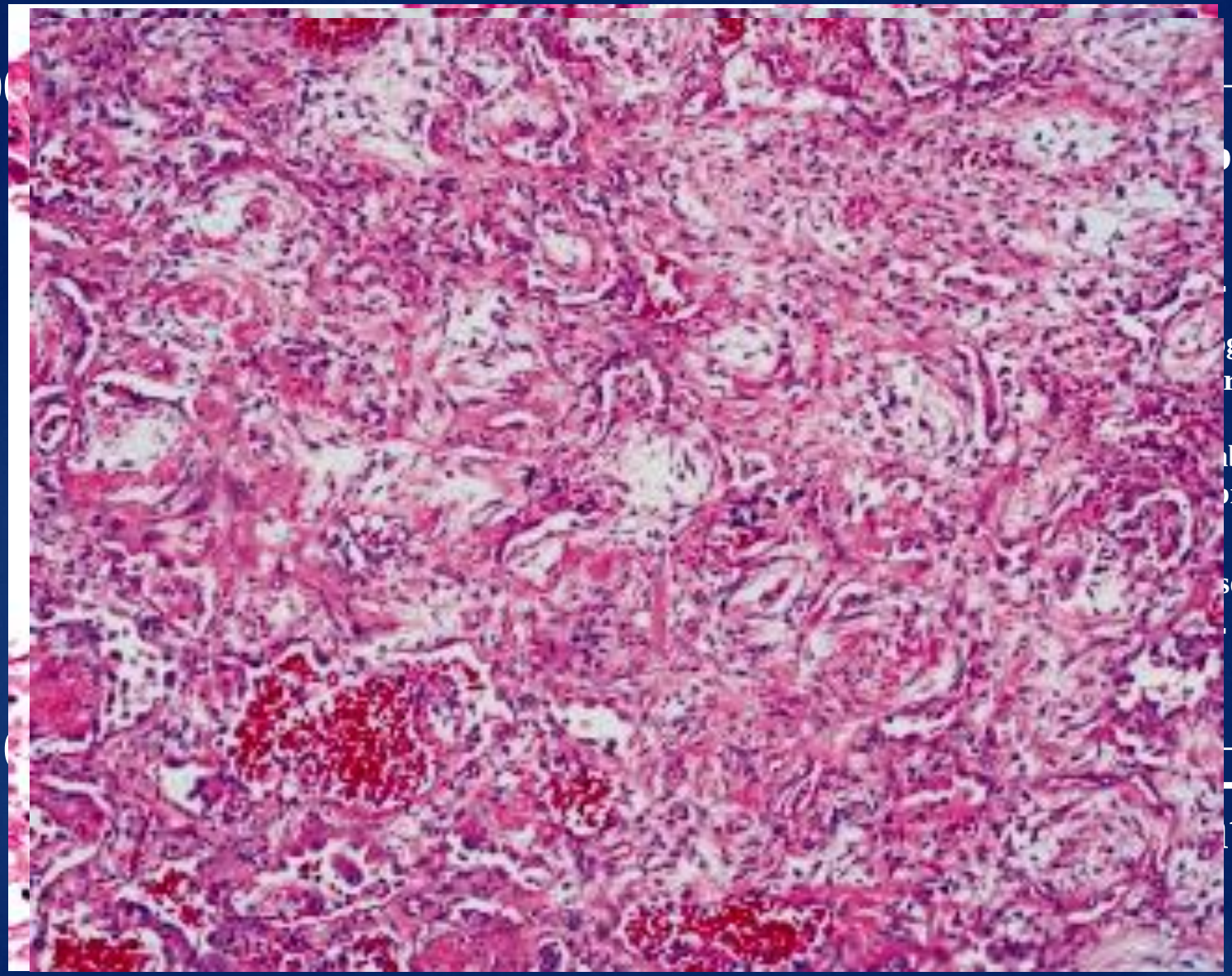
Basic lung reactions to injury

Cellular injury and repair progresses through highly reproducible phases



Phases of Clinical ARDS



Maximal Prominence

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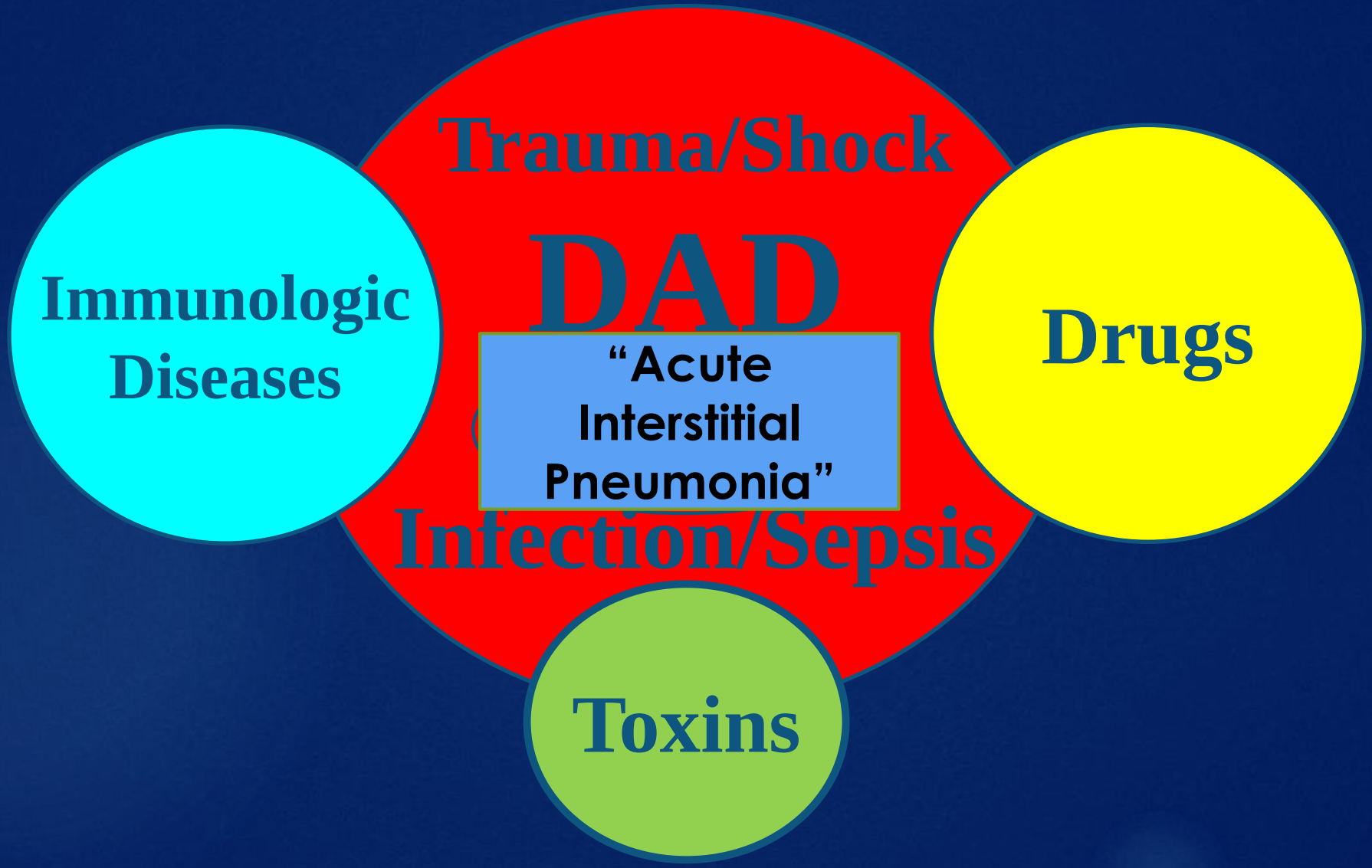
Differental Diagnosis for DAD



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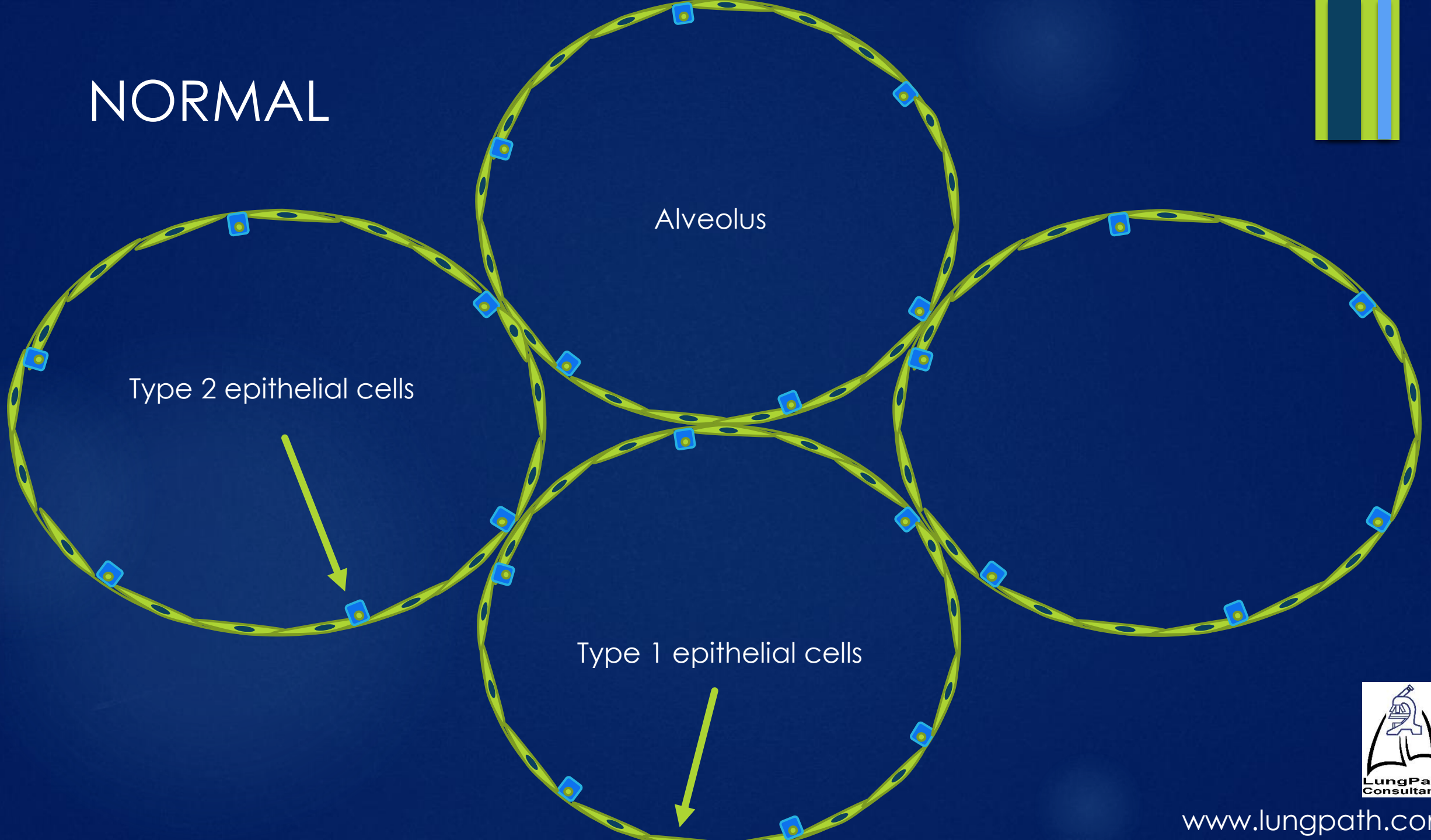
Commentary

Mechanisms of Lung Repair Following Injury

(Data derived from experimental models and corroborated in human observations)

NORMAL



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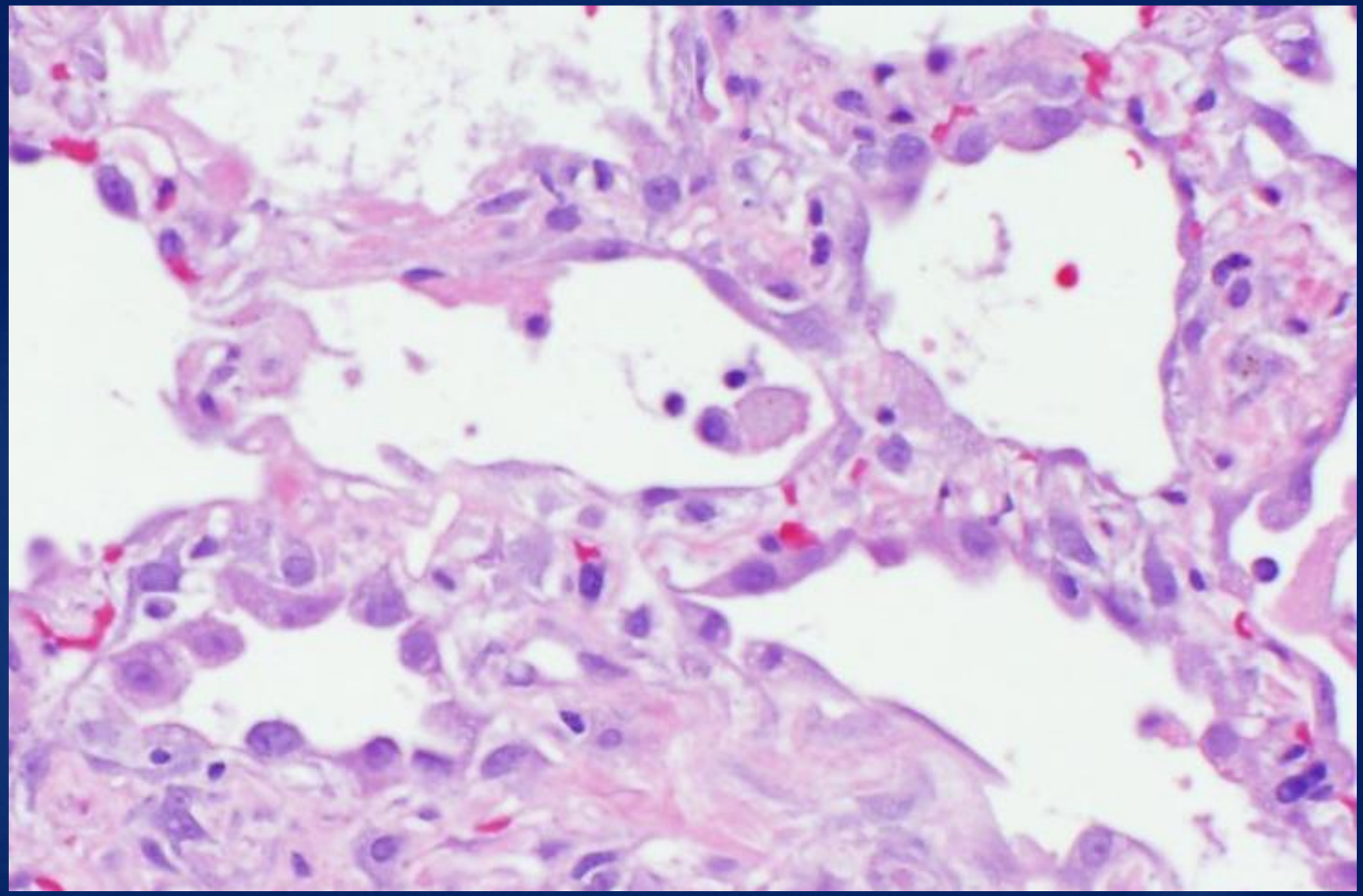
Alveolus

Alveolus



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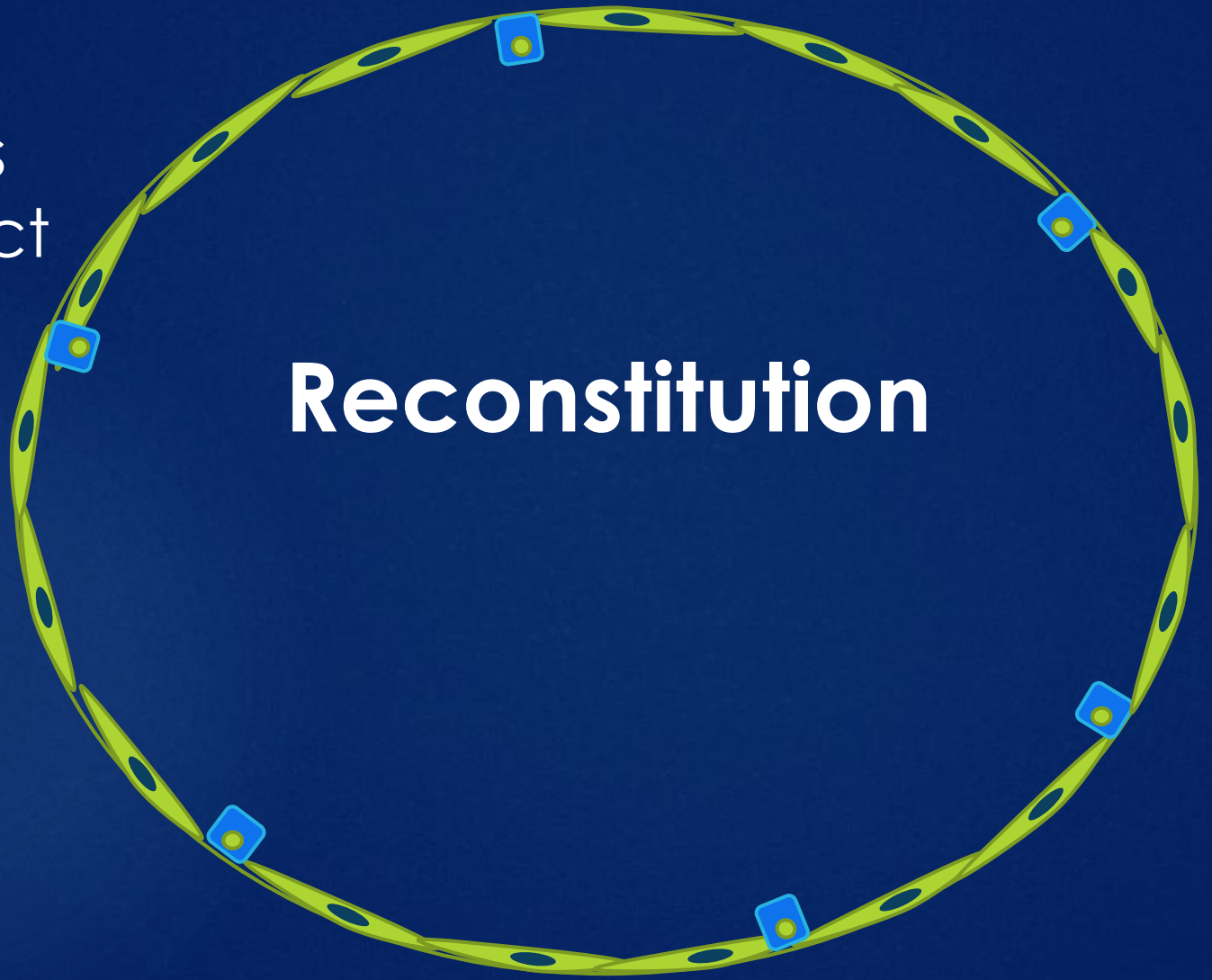
IF Injury subsides
AND
Basement membranes remain intact

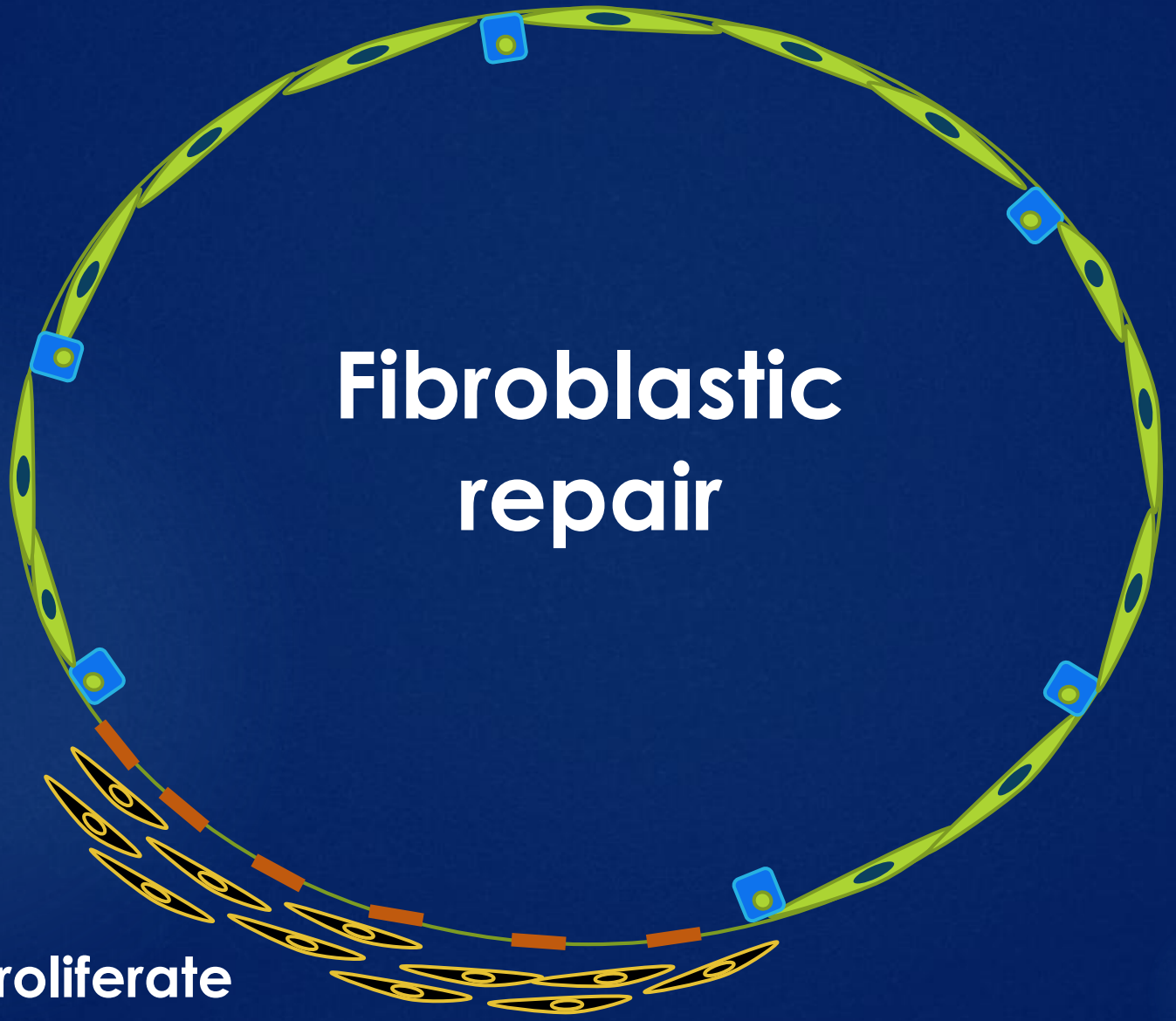
Alveolus



BUT…

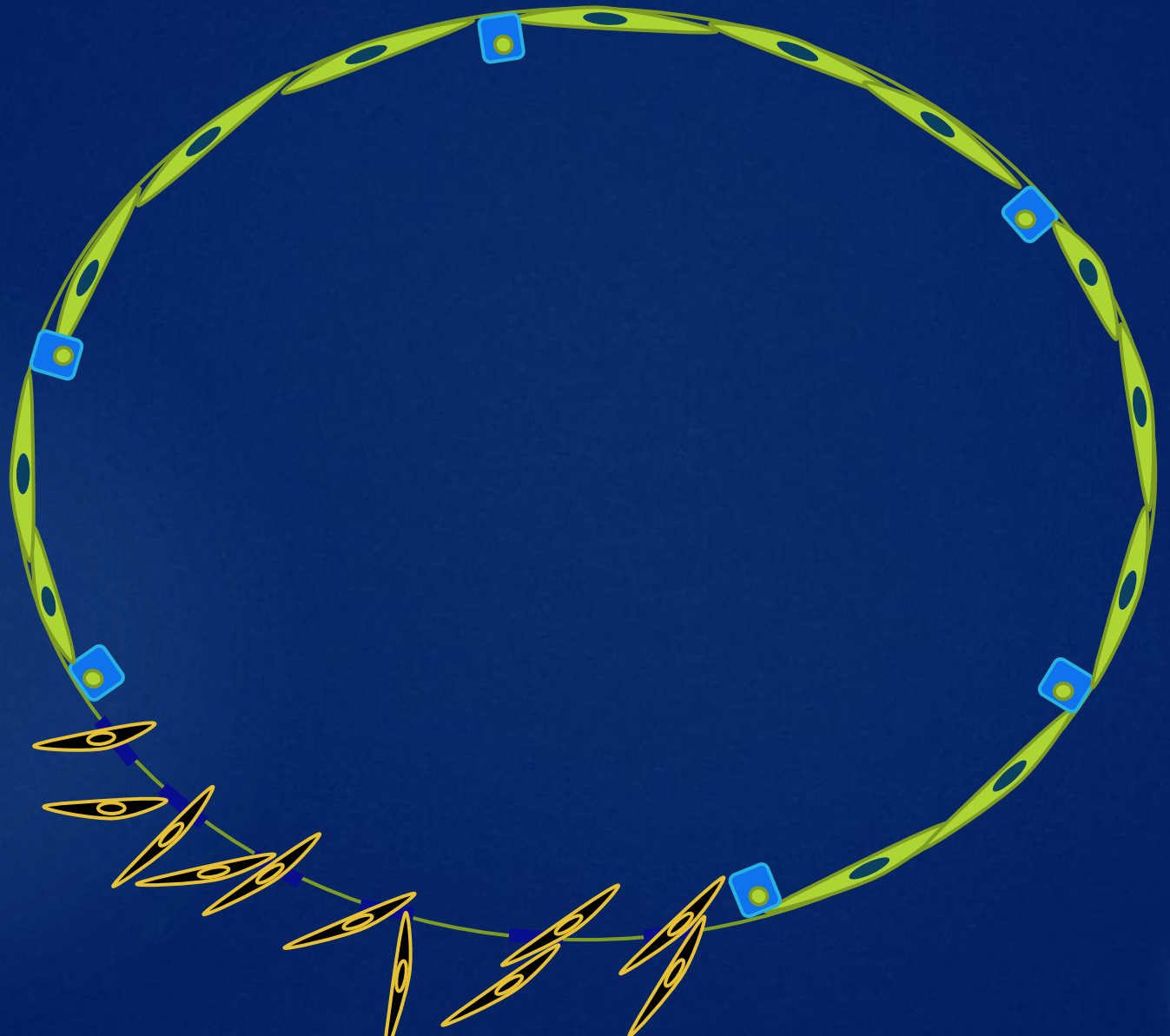
If the injury damages the epithelial basement membrane…

Alveolus



Fibroblasts proliferate

Alveolus



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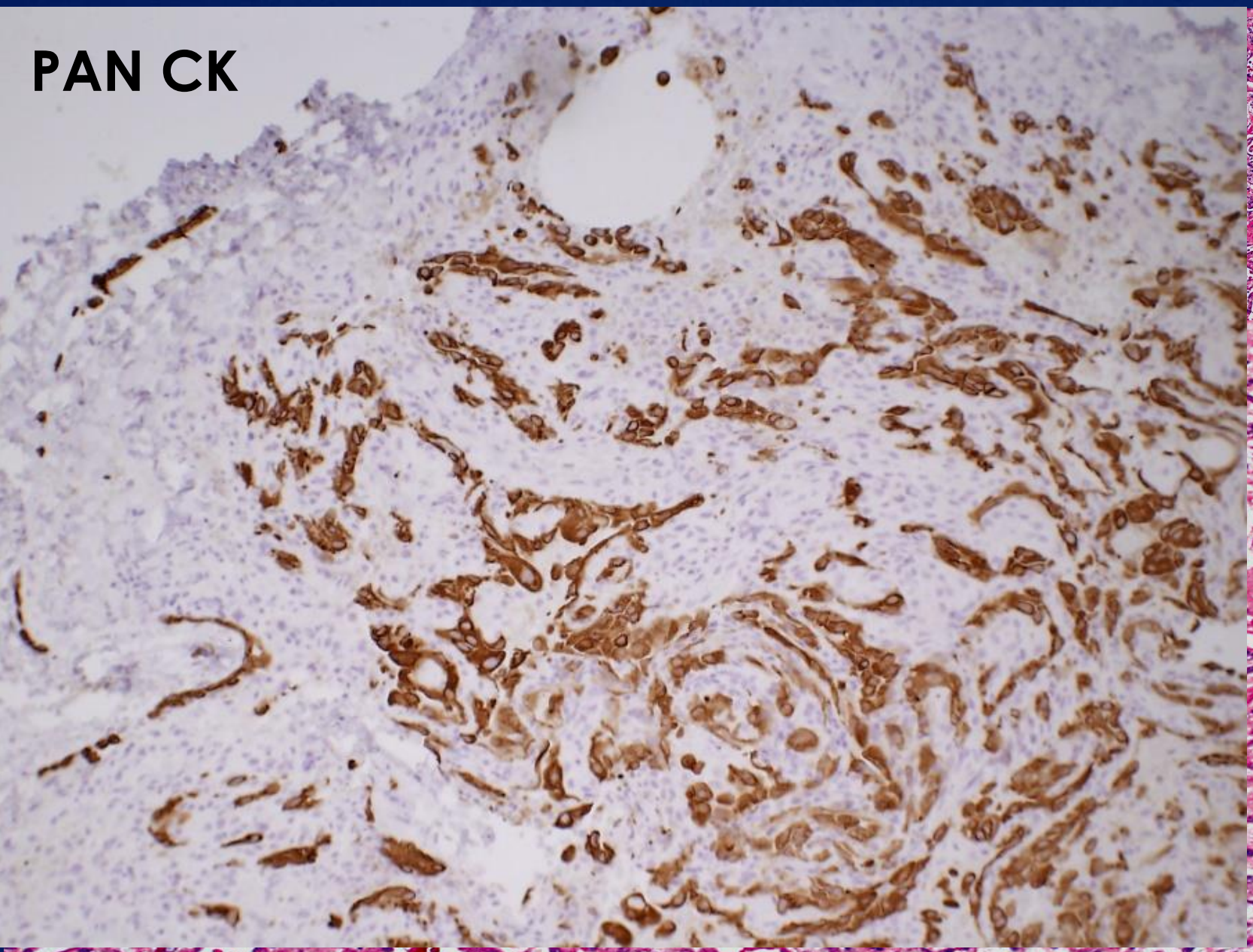

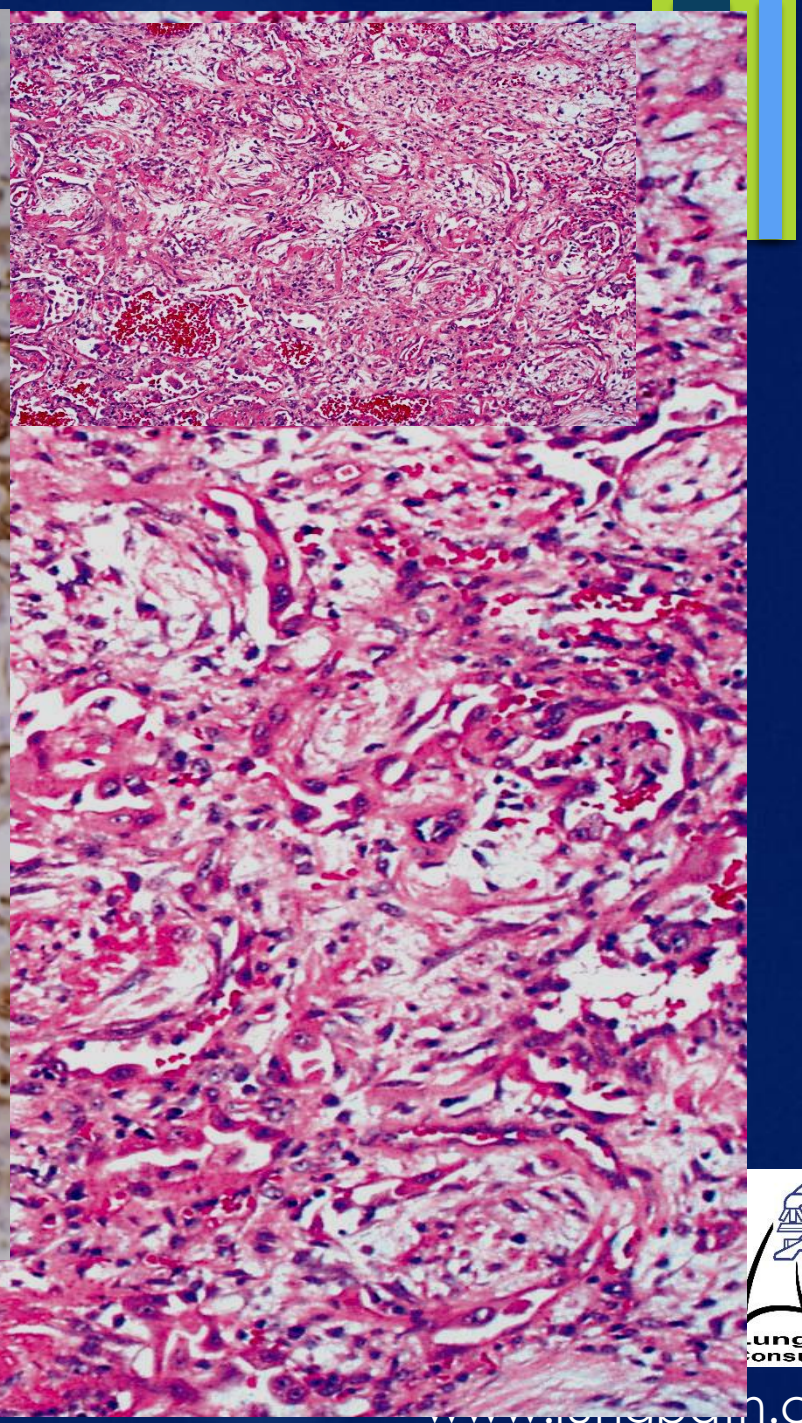

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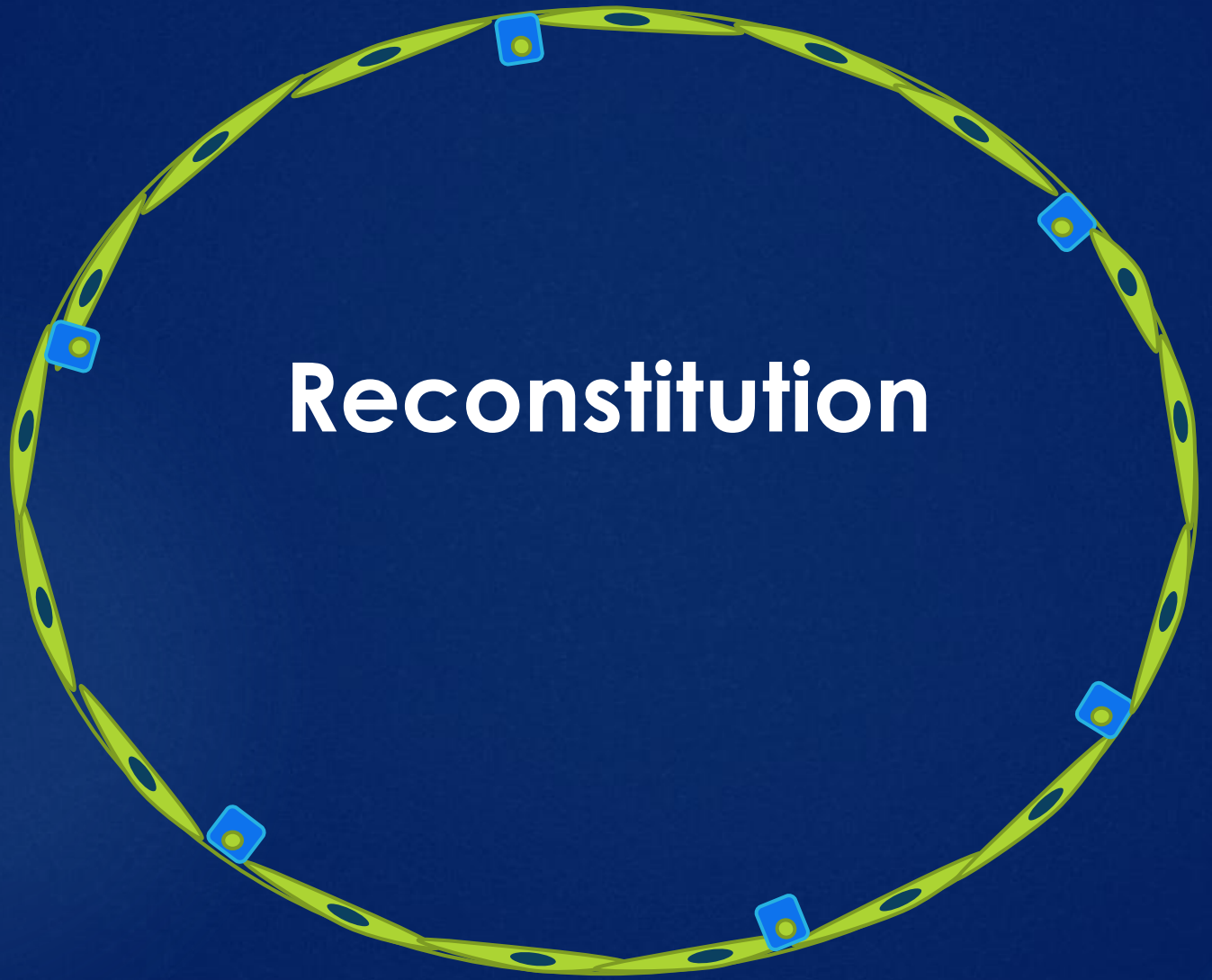
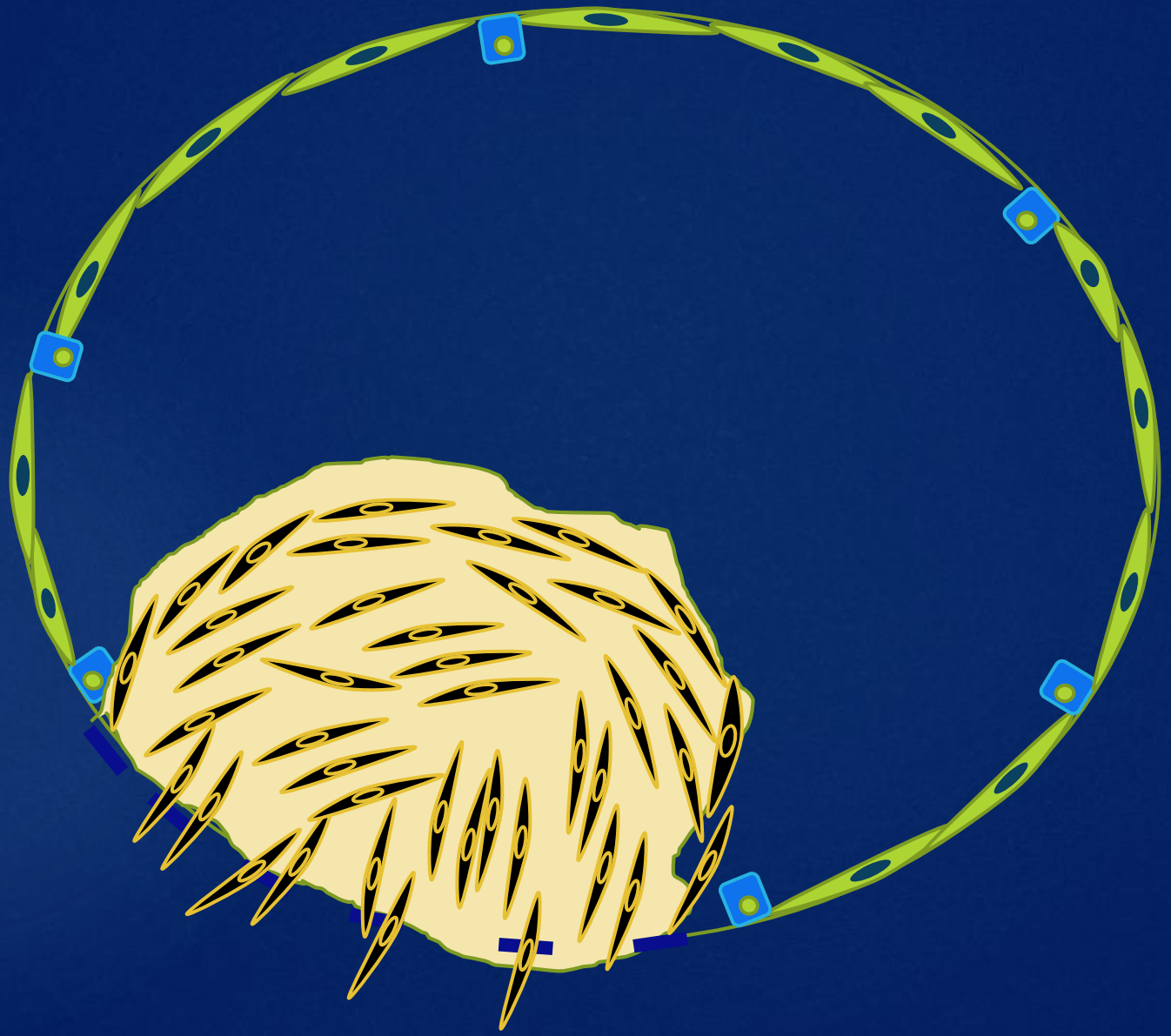
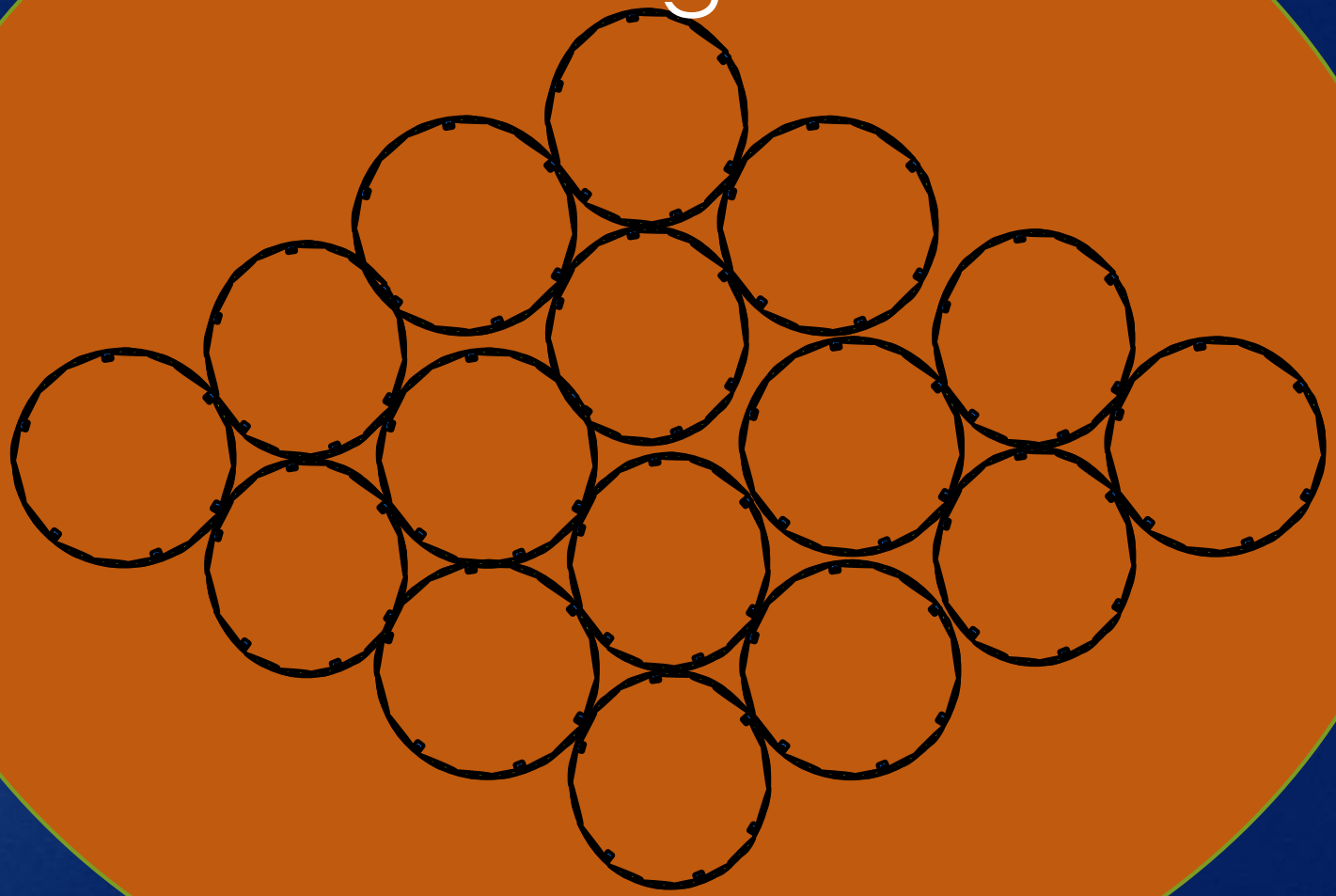


Alveolus



If the injury is severe or prolonged, alveolar destruction and fibrosis occur.

Normal lung structure



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Honeycomb Lung

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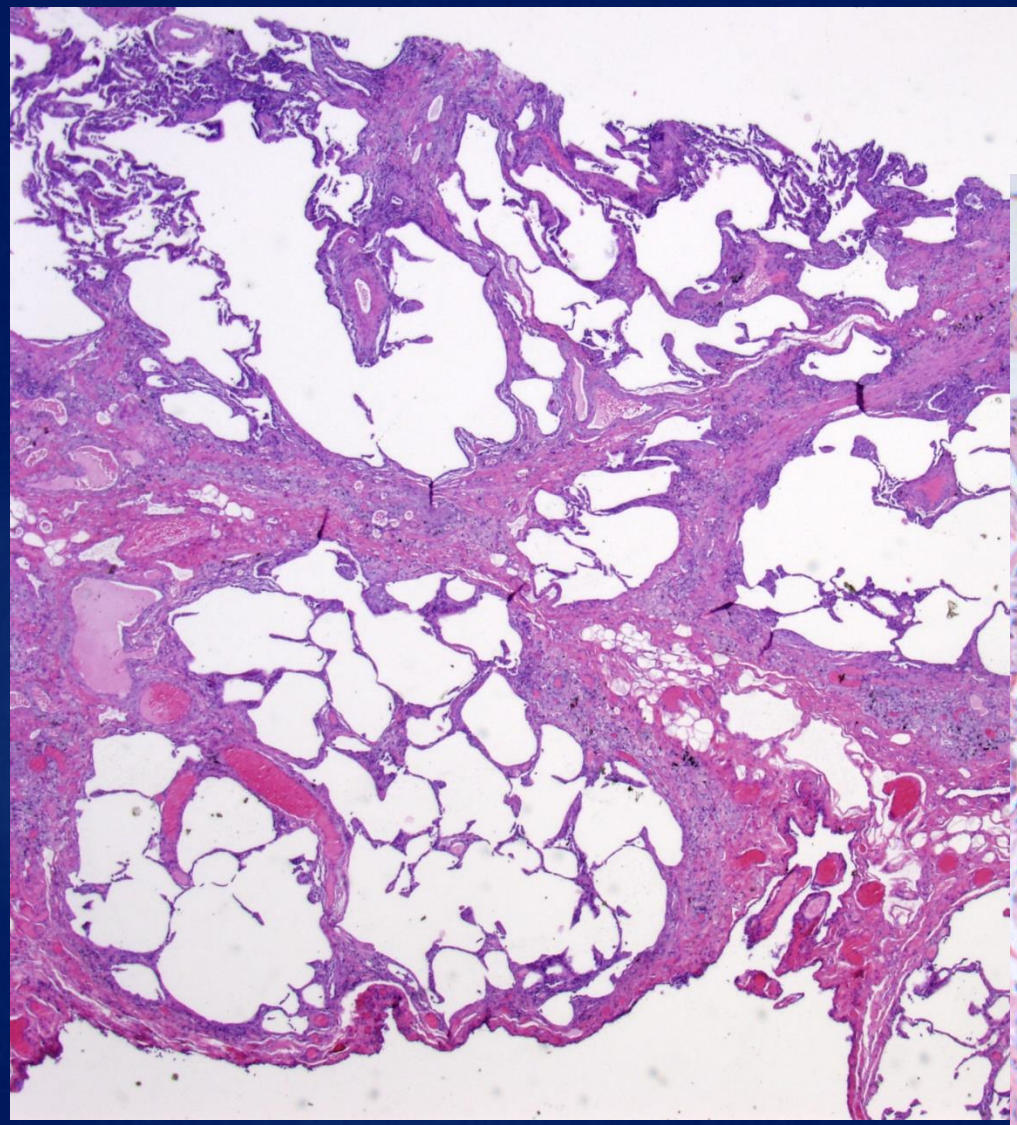
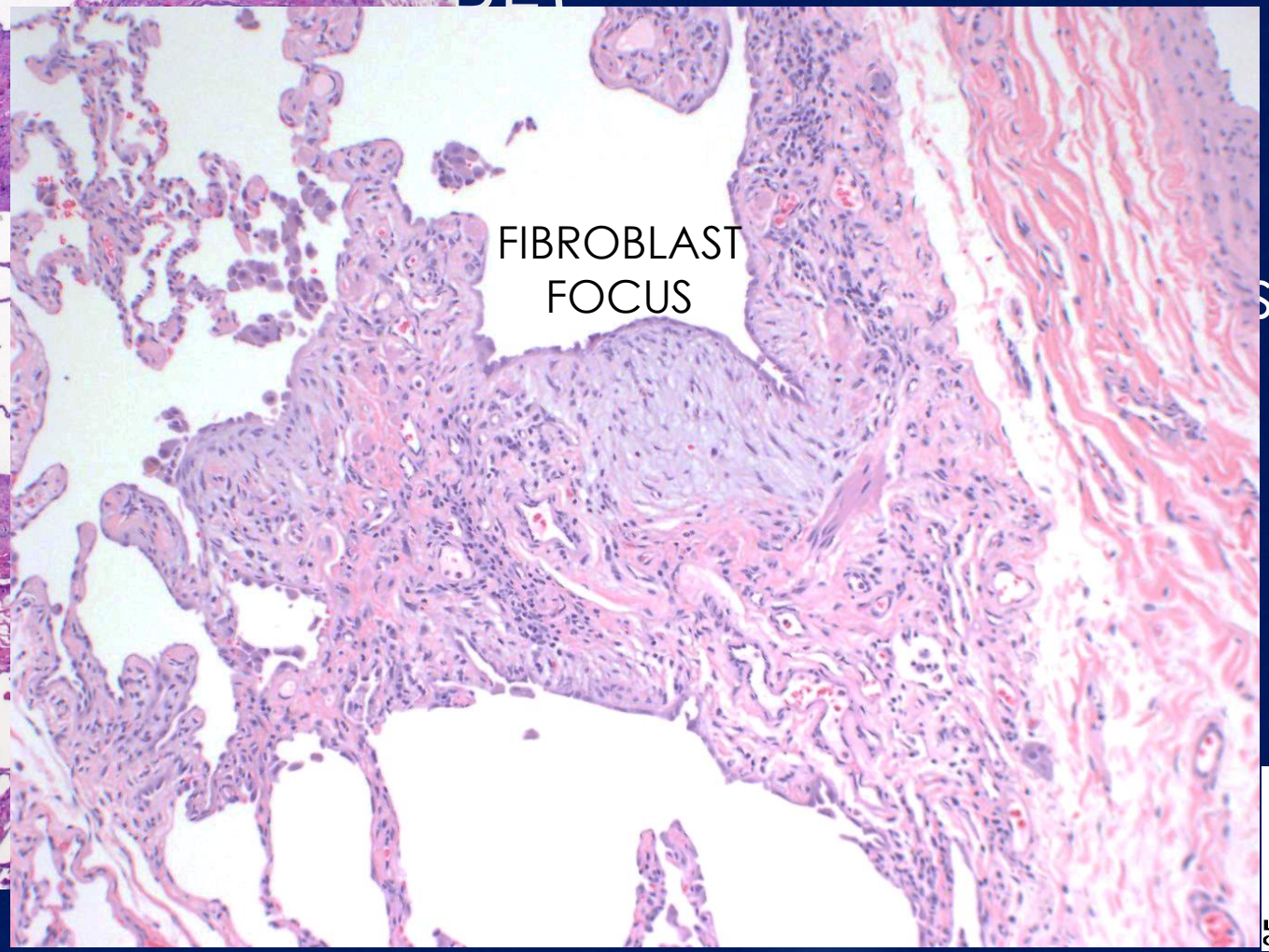
The most common cause of **honeycomb lung**

(UIP) in clinical

sis

for





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Commentary

Importance of DOMAINS

The four Domains

Clinical/lab presentation

Radiologic findings

Pathologic injury pattern

Disease entity that fits

Clinical Domain

Acute: Hours to days in evolution

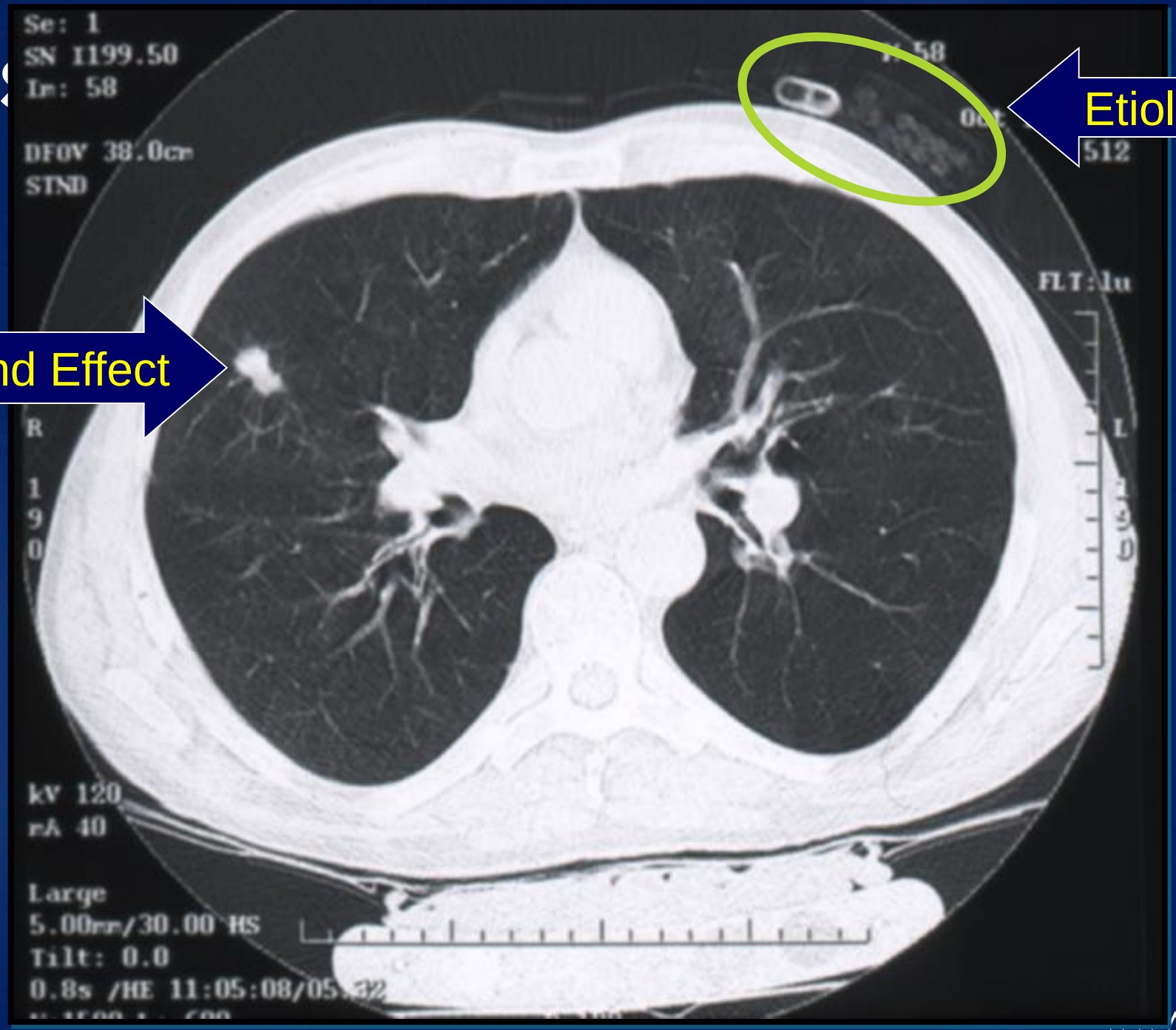
Subacute: Weeks to months in evolution

Chronic: Months to years in evolution

Radiological Domain

1. Acute: Ground Glass and consolidation
2. Subacute: Ground glass and consolidation (+/- Air trapping)
3. Chronic: Reticulation and structural distortion (+/- honeycomb cysts)

The Ches
domain!



Etiology

End Effect

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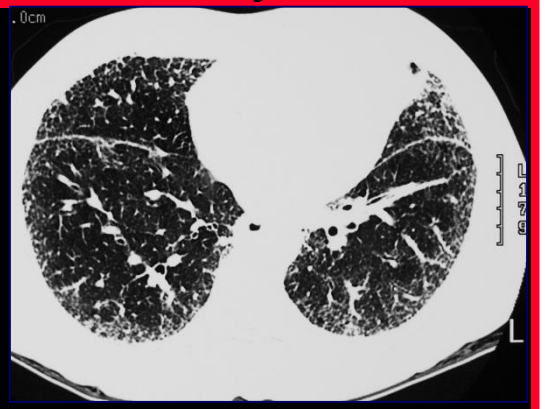
Differential diagnosis

The 4 CT Patterns of Pulmonary Disease

Ground Glass and consolidation

Alveolar Filling	**Interstitial cells/ protein**
Neutrophils	Lymphocytes
Edema	Neutrophils
Macrophages	Edema/fibrin
Hemorrhage/Fibrin/protein	
Fibroblasts	**Interstitial fibrosis (mild)**
Organizing pneumonia	
(any cause)	



Fibrosis

Alveolar Filling	**Interstitial cells/ protein**
Neutrophils	Lymphocytes
Edema	Neutrophils
Macrophages	Edema/fibrin
Hemorrhage/Fibrin/protein	
Fibroblasts	**Interstitial fibrosis (mild)**
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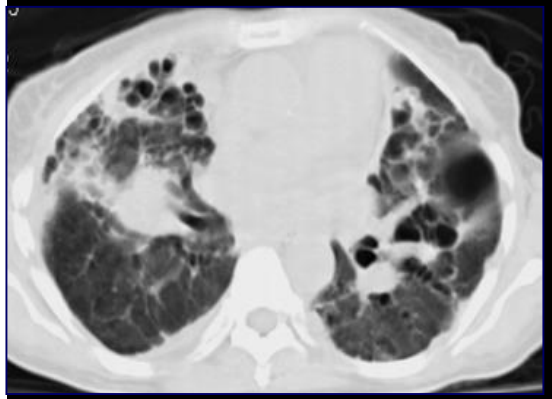


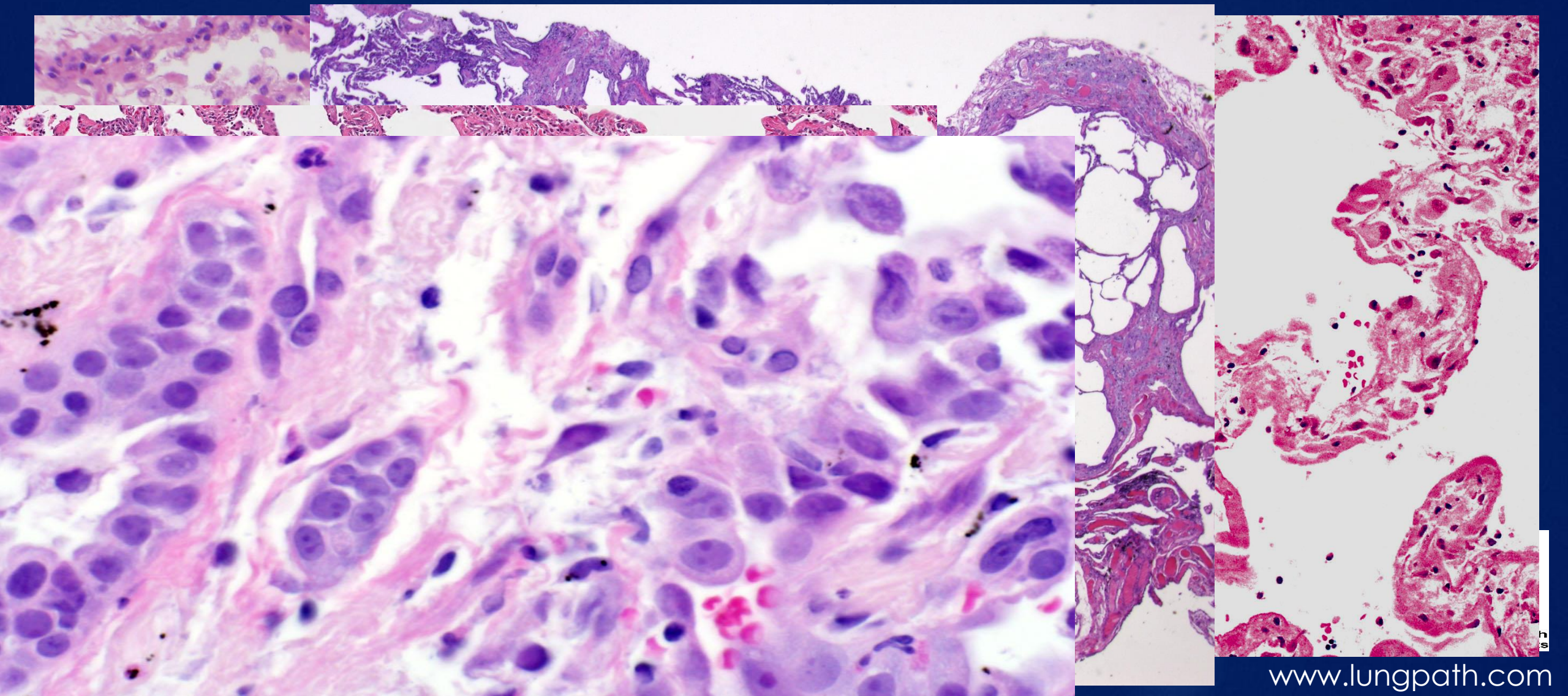
Nodules

Alveolar Filling	**Interstitial cells/ protein**
Neutrophils	Lymphocytes
Edema	Neutrophils
Macrophages	Edema/fibrin
Hemorrhage/Fibrin/protein	
Fibroblasts	**Interstitial fibrosis (mild)**
Organizing pneumonia	
(any cause)	

Mosaic patterns and cysts

Alveolar Filling	**Interstitial cells/ protein**
Neutrophils	Lymphocytes
Edema	Neutrophils
Macrophages	Edema/fibrin
Hemorrhage/Fibrin/protein	
Fibroblasts	**Interstitial fibrosis (mild)**
Organizing pneumonia	
(any cause)	

Pathology Domain



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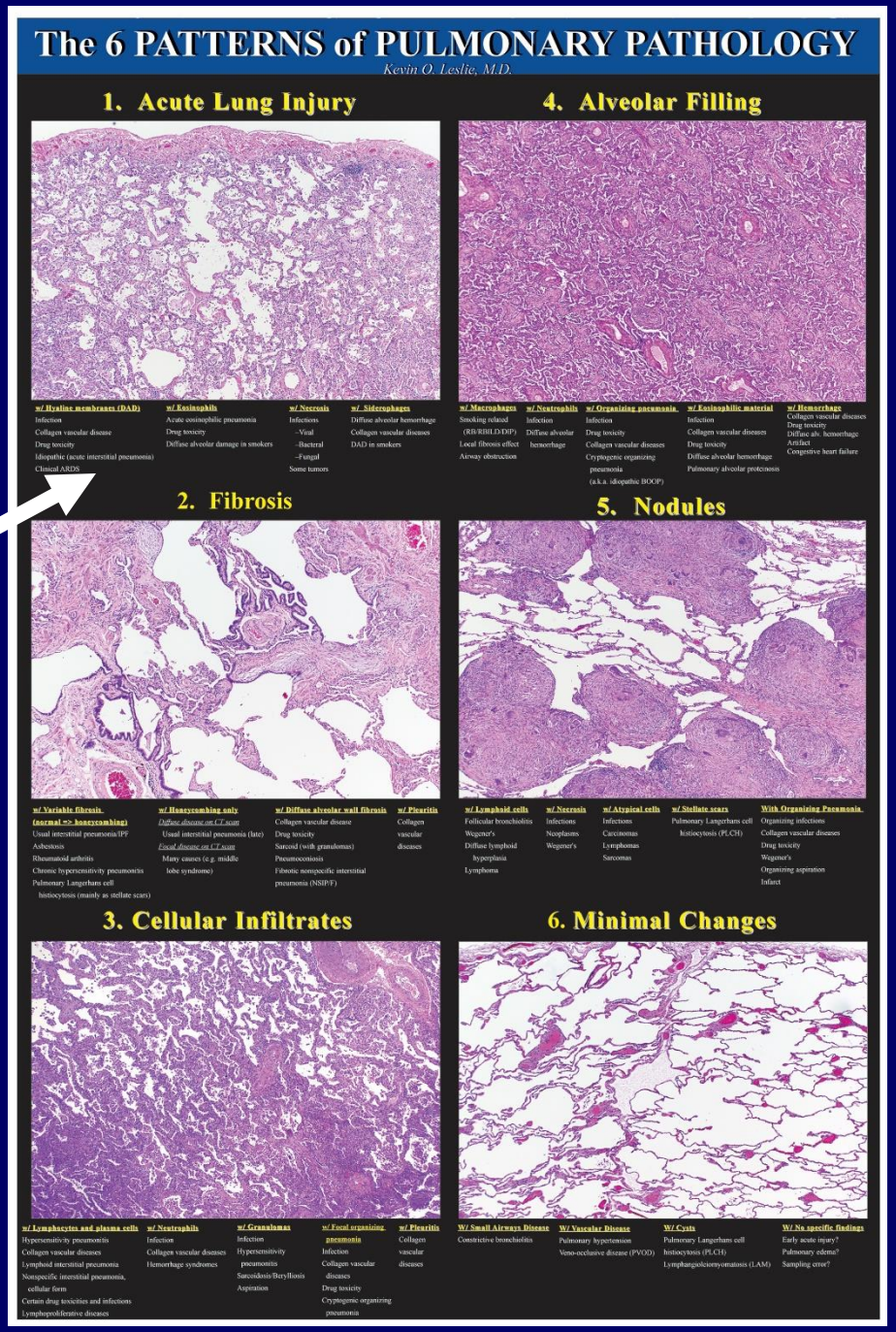
Differential diagnosis



Patterns of Acute Injury with DDX

DIFFUSE ALVEOLAR DAMAGE From infection From CVD From unknown cause (AIP)
From drug or toxin In clinical ARDS

ACUTE EOSINOPHILIC PNEUMONIA Asthma From drug From unknown cause (Idiopathic)

ACUTE FIBRINOUS AND ORGANIZING PNEUMONIA (AFOP)

VASCULITIC AND IMMUNOLOGIC DISEASES
Granulomatosis w/ polyangiitis (Wegener)
Systemic connective tissue diseases
Anti-GBM disease (Goodpasture)
Microscopic polyangiitis
Churg-Strauss syndrome

ACUTE EXACERBATION OF CHRONIC DISEASE e.g. of IPF

The "Litany" in Cases of Acute Lung Injury

FIRST Look for Bugs Do at least AFB and GMS!

NEXT Rule out Drugs (clinical record)

THEN Check the Serology + CBC + Sed rate

All NEG? Clinician calls it "idiopathic"

Histopathology rarely solves these issues alone

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How different biopsy techniques influence the diagnosis

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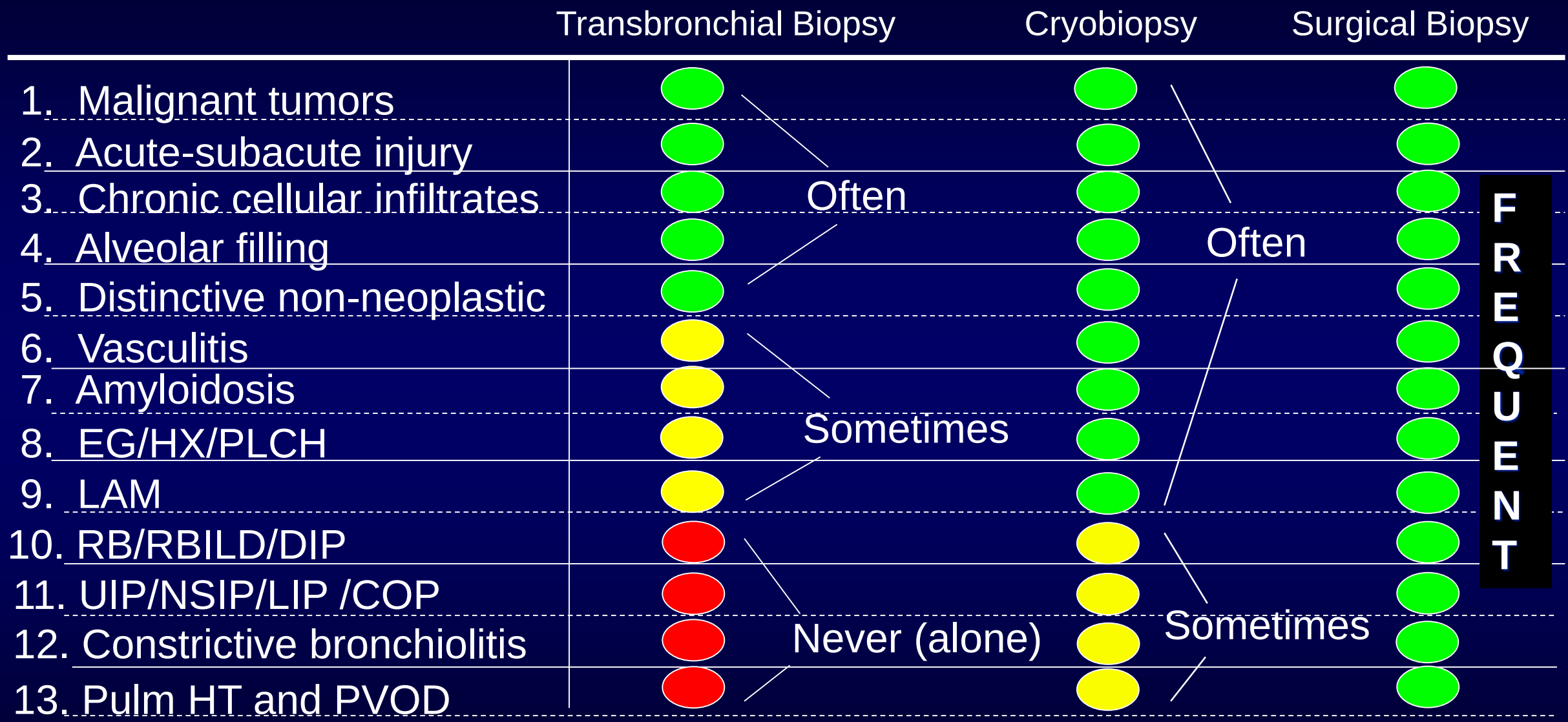
Common Diagnoses: TbBx v. CryoBx v. SLB



Commentary

Key References

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Leslie, KO: My Approach to Interstitial Lung Disease, J Clin Pathol J Clin Pathol 62:387-401, 2009

Leslie KO: Transbronchial biopsy interpretation in the patient with diffuse parenchymal; lung disease. Arch Pathol Lab Med 131:407-23 2007

Course Description

Part 1: Introduction to critical domains (Clinical, Radiological, Histopathological, Specific diseases) and basic patterns of lung injury and repair.

Part 2: Additional patterns of lung fibrosis and inflammatory infiltrates in interstitial lung disease (ILD).

Part 3: Approach to granulomatous lung disease.

Part 4: ILD with airway-centering and bronchiolitis.

Part 5: Non-neoplastic lung disease potpourri

AUDIENCE

Comments and Questions?