

Integration of Pathology Content into a First-Year Medical School Histology Course and its Impact on Student Performance: A Preliminary Report

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No disclosures to be made.

- Pathology comprises 44-52% of Step 1 tested content (USMLE.org)
- Spaced repetition is key to successful learning.
- Integrated curriculum shown to be helpful
- Would integrating pathology with histology:
 - Facilitate subjective student experience?
 - Improve academic outcomes?



Content Description and General Information USMLE Step 1

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*** = M1 Courses with Some / Limited Coverage in Pathology Course**

Table 3: Step 1 Discipline Specifications*

Discipline	Range, %*
Behavioral Sciences	8–13
* Biochemistry & Nutrition	14–24
* Genetics	5–9
* Gross Anatomy & Embryology	11–15
* Histology & Cell Biology	8–13
* Immunology	6–11
* Microbiology	10–15
Pathology	44–52
Pharmacology	15–22
* Physiology	25–35

Topics Overlap: Lower Ranges = 146%

*Percentages are subject to change at any time. See the USMLE website (www.usmle.org) for the most up-to-date information.
usmle.org/pdfs/step-1/content_step1.pdf & <https://www.usmle.org/step-1/#content-outlines>

YJBM
YALE JOURNAL OF BIOLOGY AND MEDICINE
CELEBRATING 60 YEARS 1954-2014

Yale J Biol Med. 2014 Jun; 87(2): 207-212.
 Published online 2014 Jun 6. PMID: [24910586](https://pubmed.ncbi.nlm.nih.gov/24910586/) PMCID: PMC4031794

How to Learn Effectively in Medical School: Test Yourself, Learn Actively, and Repeat in Intervals
 Marc Augustin

Family Practice
 © Oxford University Press 1989

The Edinburgh Declaration

D H H METCALFE

- Integrate 2-4 pathology topics per histology lecture
 - Selected by Dr. Phillip Boyer and Mitchell Jester
 - Overseen by Dr. Ann Sperry, Histology Course Director
 - Pathology slides prepared, sent to histology lecturers at least 1 week in advance
- Survey class after completion of course
 - Surveyed on subjective assessment of utility, understanding, and enhancement of learning
 - Survey Monkey used for collection
 - 2 extra credit points toward Block 3 Pathology Examination for participation
 - Class of 2023 survey completed May 2020
 - Class of 2024 survey to be completed May 2021

Muscle

Skeletal Muscle

Hypertrophy

Non-Exercised: Normal | Weight-Lifting: Hypertrophy

ADAM / MedlinePlus.gov

Hypertrophy:
Directed Protein Synthesis → Increased Number of Myofibrils and then Sarcomeres

Same Slide Used in Path. Lecture

Skeletal Muscle: Cross-Section of Fibers

Normal Size	Hypertrophy

Electron Microscopy: Longitudinal Section

Skeletal Muscle

Atrophy

Normal Control | Disuse or ALS: Atrophy

Same Slide Used in Path. Lecture

Atrophy:
Protein Catabolism → Reduced Number of Myofibrils and Sarcomeres

Skeletal Muscle: H&E Stain Cross-Section of Fibers

Type II Atrophy: Disuse; Steroid Myopathy

Normal-Sized Type I Fiber | Atrophic Type II Fibers

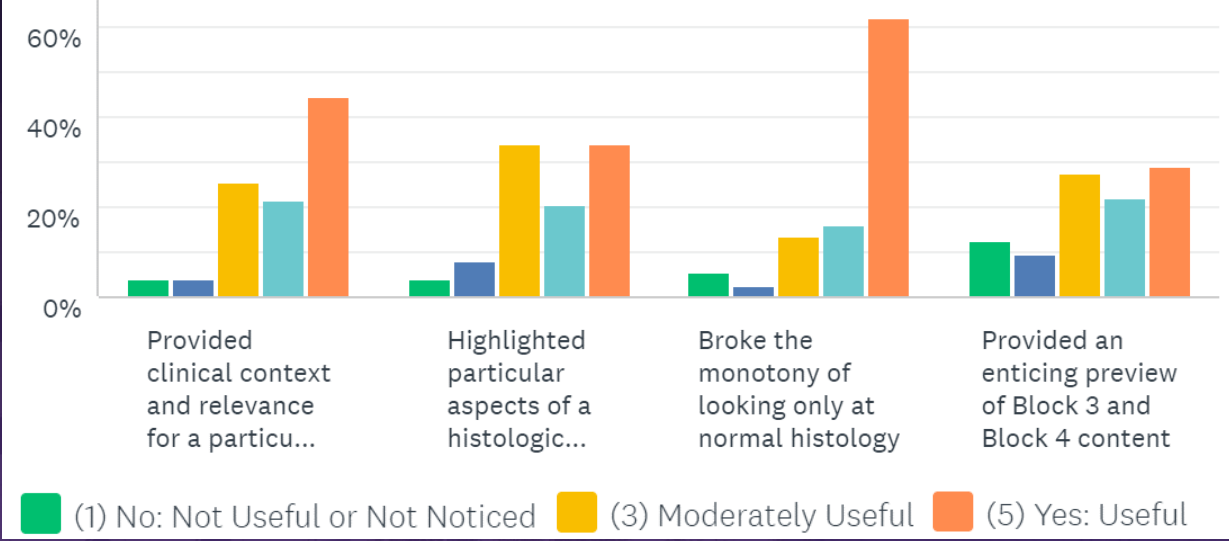
ATPhase pH 9.4

Denervation Atrophy: Amyotrophic Lateral Sclerosis (ALS)

Normal-Sized Fiber | Atrophic Denervated Fibers

Hypertrophic Fiber: Compensatory

Survey: Helpful? N=74/79



Respiratory

Emphysema: Macroscopic

~ Normal Lung | Mild Emphysema | Severe Emphysema

Anthracosis - Pleural and Parenchymal | Subpleural Bullae (>1 cm)

Photos: Autopsy Specimens

Same Slide Used in Path. Lecture

Emphysema: Microscopic

Control: 36-Year-Old Man | Severe Emphysema: 74-Year-Old Man

10X | 10X

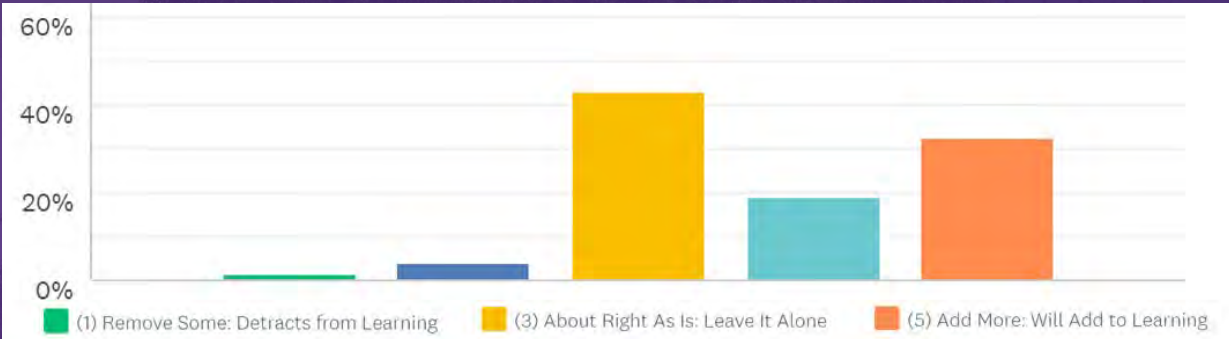
Loss of Septa & Dilated Air Spaces

"Free-floating septa"

Photos: Autopsy Specimens

Same Slide Used in Path. Lecture

Survey: Recommendation for Future Years



- Well received by students overall.
- Improved understanding and Context of topics.
- Survey of Class of 2024 pending.
- Overall medical education trends and our research findings both indicate further incorporation should be examined.
- Pathology shelf exams will be compared to previous classes, who did not have pathology-histology integration.