

# Active Learning Session Combining Biochemistry, Genetics and Pathology in a Hematology and Oncology Pre-clerkship Course



Renee J. Chosed<sup>1</sup>, Anna V. Blenda<sup>1</sup> and Jenny Knight<sup>2</sup>

<sup>1</sup>Department of Biomedical Sciences, University of South Carolina School of Medicine Greenville, Greenville, SC

<sup>2</sup>Department of Pathology, Prisma Health, Greenville, SC



## BACKGROUND

The University of South Carolina School of Medicine Greenville rolled out a refreshed curriculum to first-year students in the fall of 2023. This refresh moved the Hematology and Oncology course from early in the second-year to early in the first-year which provided an opportunity to deliver basic science content alongside pathology content. Refreshed courses incorporated active learning sessions with required student attendance. Therefore, new active learning sessions needed to be developed that engaged students and reinforced course content.

## PURPOSE

➤ To develop an engaging active learning session for the first-year Hematology and Oncology course that incorporates biochemistry, genetics and pathology content.

## METHODS

A brief case report on Lynch syndrome was provided to students at the start of the required active learning session in the first-year Hematology and Oncology course. Students worked in groups to answer questions that assessed their understanding of biochemistry (mutation impact on protein function), genetics (inheritance pattern in pedigree) and pathology (grading and staging of tumor) content presented in the case report. Faculty reviewed the correct answers as a large group. Next, student groups were assigned to write one NBME-style question regarding the case that assessed biochemistry, genetics and/or pathology knowledge. The student groups wrote their questions and then submitted questions via Padlet so that all in attendance could see their work. Finally, faculty reviewed the submitted questions as a large group. Students were provided a QR code to share their opinion of the session via an online survey.

1. Read the short case report if you have not done so already.
2. Briefly discuss the genetics and biochemistry of this case:
  - a) What does the pedigree tell you about the inheritance of Lynch syndrome?
  - b) Why is the mutation identified in the MLH1 gene significant?
3. Briefly discuss the pathology presented in this case:
  - a) Discuss the type of tumors the proband had.
  - b) Discuss the grading and staging of the malignancies in this family.

1. Write one NBME-style question regarding this case. Your question should assess genetics, biochem or pathology knowledge. \*\*\*We will review how to do this on the next slides\*\*\*
2. Submit your question on the Padlet linked here: <https://padlet.com/chosed/lynch-syndrome-case-questions-zszza3p1ugdtff69>
3. Review the questions submitted by your classmates.

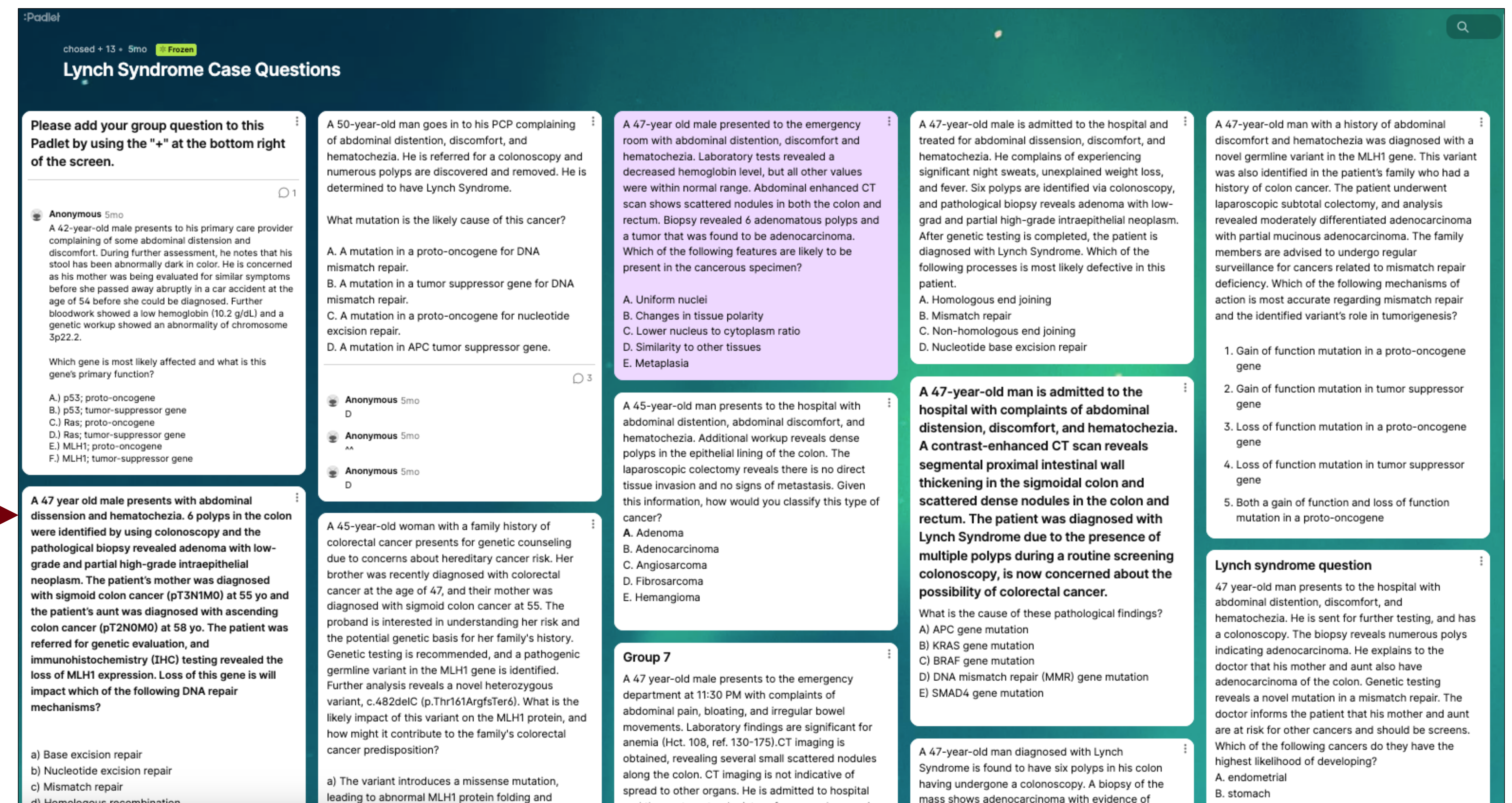


Figure 1: Slides with directions provided to the students for the in-class activity and the resulting student-authored questions submitted via Padlet.

## RESULTS

The active learning session was well-received by students as their feedback on the survey revealed that the session added value to their learning of the content. The NBME-style questions written by the students demonstrated that they were able to link the biochemistry and genetics content to the pathology content and clinical information.

- ~78% of students completing end-of-session survey rated the session as having good, very good or excellent value in participation and in format.
- Student comments:  
"the journal club was an amazing real-life application"  
"It was perfectly balanced with the practice questions, applying knowledge to outside research"

## CONCLUSIONS

Introduction of an active learning session in a Hematology and Oncology first-year course allowed students to apply their biochemistry, genetics and pathology knowledge to a clinical case. The group activity linked the basic science content to clinical content which may help first-year medical students retain more of their basic science knowledge.

Reference: Lu, Xiaohuan et al. "Identification and genetic counseling for a novel variant of MLH1 associated with lynch syndrome in colorectal cancer: a case report." *Gastroenterology Report* 11 (2023): goad049.