

RATIONALE/NEED

- Medical education includes the review and synthesis of a vast amount of information.
- Incorporation of mnemonic strategies can help to aid in both short-term and long-term memory of concepts.
- The study of the value of mnemonics education dates back to the 1970's and 1980's and an academic classification scheme has been proposed (Bellezza, 1981; Malhotra, 1991):

Mnemonic Type	Instances	Examples
"Peg" Type	Method of loci Initialisms or Acronyms	Method of loci example (walking through house) to recall a grocery list.
"Chain" Type	Story mnemonics Link mnemonics	Rhymes "I before E, except after C, or when sounding like A, like in neighbor and weigh."
Concrete Word Encoding	Visual imagery	If you always see your grandparents in their house, visiting their house even when they are not home may make you think of them.
Abstract Word Encoding	Semantic Encoding Phonetic encoding	Remembering "chica" means "girl" in Spanish by associating "chica" with "chick", which is English slang for "girl".

- Mnemonics are used extensively in the East Carolina University Brody School of Medicine pathology course with the goal of consolidating information in a memorable way, e.g. the distinction between primary biliary cirrhosis and primary sclerosing cholangitis, allowing for both (1) short-term and (2) long-term retention and retrieval of information.
- The Brody Mnemonic Challenge was developed to inspire year 1 (M1) and year 2 (M2) medical students to develop and incorporate mnemonics as a study tool.

METHODS

- This report summarizes the development of the Brody Mnemonic Challenge and student participation.
- A SurveyMonkey survey was conducted to assess student impressions of the project.
- A literature search was conducted using pubmed.gov, scholar.google.com, and google.com using key words medical education and mnemonics.

RESULTS

Design:

- As an optional extra-credit project, students were asked to submit 3-5 mnemonics for the M1 basic pathology and for the M2 organ system pathology courses and they then receive an extra-credit point for their score on the course's examination.
- The "body of work" of each student over the academic year was compiled and Pathology Curriculum Improvement Awards were presented at the 2022 Brody Awards Ceremony to the five M2 students with the best composite contributions.

RESULTS

Participation

Academic Year	Students Participating
2021-2022	51 / 93 = 55%
2022-2023	73 / 78 = 94%

Examples of Excellent Submissions

#5: Concept: Granulomatous inflammation involves IL-12 and INF-gamma chemical mediators; oftentimes, this inflammation is predominantly associated with tuberculosis and rheumatoid arthritis.

12 grannies and grandmas with tuberculosis and rheumatoid arthritis began making their patch-work quilt.

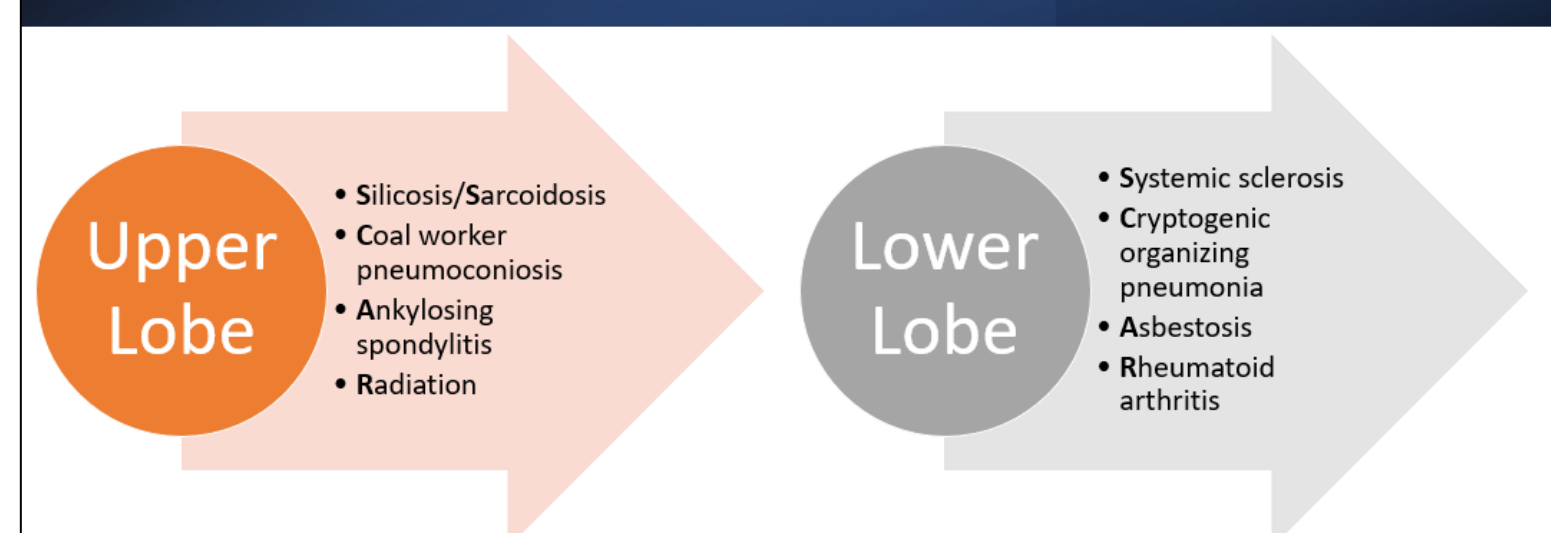
- IL-12 - 12
- Granulomatous - Grannies
- INF-gamma - "Gamma... Grandma"
- Tuberculosis - Photo looking pretty pre-BCG vaccine era
- Rheumatoid arthritis - Older folks, impairs small joints, so quilting would be hard



The 6 P's of Dyspnea

- Pulmonary bronchial constriction
- Possible foreign body
- Pulmonary embolus
- Pneumonia
- Pump failure
- Pneumothorax

Causes of Pulmonary Fibrosis - S.C.A.R.



Examples of Very Good Submissions

Sarcoidosis Mnemonic:

S - Schaumann calcifications
A - Asteroid bodies/ACE increase/Energy
R - Respiratory complications/Renal calculi/Restrictive lung dx/Restrictive cardiomyopathy
C - Calcium increase in serum and urine/CD4 helper cells
O - Ocular lesions
I - Immune-mediated noncaseating granulomas/Ig increase
D - Diabetes insipidus/D vit. Increase/Dyspnea
O - Osteomyopathy
S - Skin/subcutaneous nodules/erythema nodosum
I - Interstitial lung dx/IL-1
S - Seventh cranial nerve palsy

- Anasarca: ANN has ANNasarca, so they have effusion ANN edema
- Stasis: Staying in bed gets you Stasis
- Hydrostatic Pressure (water is blue) --> Veins are blue
- mALnutrition (low) = (low) hypoALbumin
- Good news + bad news..."Unfortunately you had a lymph obstruction, but the edema is only unilateral!"

NOW I AM ABLE TO GROW! COUNT ME LUCKY!

- ABL is a proto-oncogene, mutation to an oncogene causes neoplasms, or new growth
- Specifically, BCR-ABL translocation leads to CML

Syphilis isn't all bad. It doesn't hurt and you are given some nickels and dimes and you can win a Charcot joint.

Charcot joint. Sounds fancy, it is nice, large, and it will help you stand out at any gathering. It also is very durable so no worries if you bump it into something.

Laceration - laser-ation. The high energy laser randomly damages whatever is in its path. Irregular borders near wound and a lot of energy is transferred which leads to internal damages

Example Sufficient for Extra Credit Point

- CAT-aracts - Milky vision
- Botulism TENSE-ani
- But the babies and elderly to SLEep (Staph, Listeria, E. coli)

Survey:

Data:

- Survey responses from 79 of 81 students were obtained.
- Likert scale scores of 4 (agree) and 5 (strongly agree) were combined.
- Findings included the following:
 - Mnemonic Challenge was useful in demonstrating the value of mnemonics in learning new content (98%).
 - Students used mnemonics they created as a learning tool (77%).
 - Students would like to have had a compilation of mnemonics as they study (91%).
 - Students felt that the project should be continued in the future (99%).

Comments:

- Great study tool.
- Very useful for consolidating information.
- Love it! Helps me to remember facts that are important to know in a fun way ... it's a long-term way to remember information also
- Great way for students to share collaborative ways to learn that benefits everyone
- Brody Mnemonic challenge is engaging and pushes students to think about the material in different ways
- Engaging, fun, helps build relationship with faculty and peers. Students are also incentivized and encouraged by how their professor looks for their input!
- We don't get to use the new mnemonics during the course. / ... Google Doc would help with sharing.

LITERATURE SEARCH

- The study of the value and utility of mnemonics as a learning tool dates back to the 1970's and 1980's.
- The primary purpose of mnemonics is to facilitate recall of information.
- Functional MRI studies have found that "... mnemonic training drives distributed rather than regional changes, reorganizing the brain's functional network organization to enable superior memory performance" (Dressler, 2017).
- Mnemonic techniques facilitate generative learning, a process involving the creation of meaningful connections between new information and prior knowledge, ultimately leading to improved retention (Fiorella, 2016).
- Medical students deploying the "method of loci" mnemonic device showed significantly improved performance on assessments vs. a control group (Qureshi, 2014).
- Mnemonics have been shown to be helpful in learning psychology and other topics; studies have shown that mnemonics can be effective tool for learning complex concepts in higher education and suggests that such techniques can effectively improve learning outcomes (McCabe, 2015).

CONCLUSIONS

- Students have embraced the use of mnemonics as an aid to remembering diverse pathology concepts.
- Future goals include compilation of the best mnemonics in an online textbook organized by organ system.
- The majority of students found the Mnemonic Challenge beneficial in showcasing the effectiveness of mnemonics for learning new content, with 98% of them agreeing or strongly agreeing.
- A significant proportion of students (77%) utilized mnemonics as a learning tool, indicating that the challenge encouraged the adoption of mnemonics in their study habits.
- A majority of students (91%) expressed interest in having a compiled resource of mnemonics to aid their studies, suggesting that mnemonics are considered valuable learning tools by the participants.
- Almost all students (99%) believed that the Mnemonic Challenge project should continue in the future, reflecting the overall positive perception of the initiative and its potential impact on learning outcomes.
- These conclusions highlight students' positive experiences with the Mnemonic Challenge and emphasize the value of mnemonics in facilitating learning and information retention in medical education.

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