



Maryland Academy for Pharmacy Success (MAPS) Med Chem Winter is Coming

A Coop, S. Fletcher, F. Xue, JW. Jones, D. Deredge, SR. Tucker, G. Anagnostou
University of Maryland School of Pharmacy, Department of Pharmaceutical Sciences & Office of Academic Affairs

Background

MAPS (Maryland Academy for Pharmacy Success) was developed as a value-driven pre-matriculation program that leverages open access content to support academic success. MAPS focused on foundational concepts of chemistry and biology, in preparation for Fall P1 courses.

Spring P1 courses are focused on application of the foundational concepts of the Fall, including Applied Science and Therapeutics 1 & 2 (application of Principles of Drug Action) and Medicinal Chemistry 1 & 2 (application of foundational chemistry).

Assessment (PCOA and student success) has shown that students find such application difficult for these two series of courses, so a Winter MAPS was envisioned as a preparation for first year pharmacy students (during the winter break) by relating foundational concepts learned in undergraduate coursework and P1 Fall to healthcare applications

This poster will focus on the application to Medicinal Chemistry (as submitted via the Chemistry Section), but the lead author is more than willing to discuss the pharmacology Winter MAPS

Philosophy for Approach

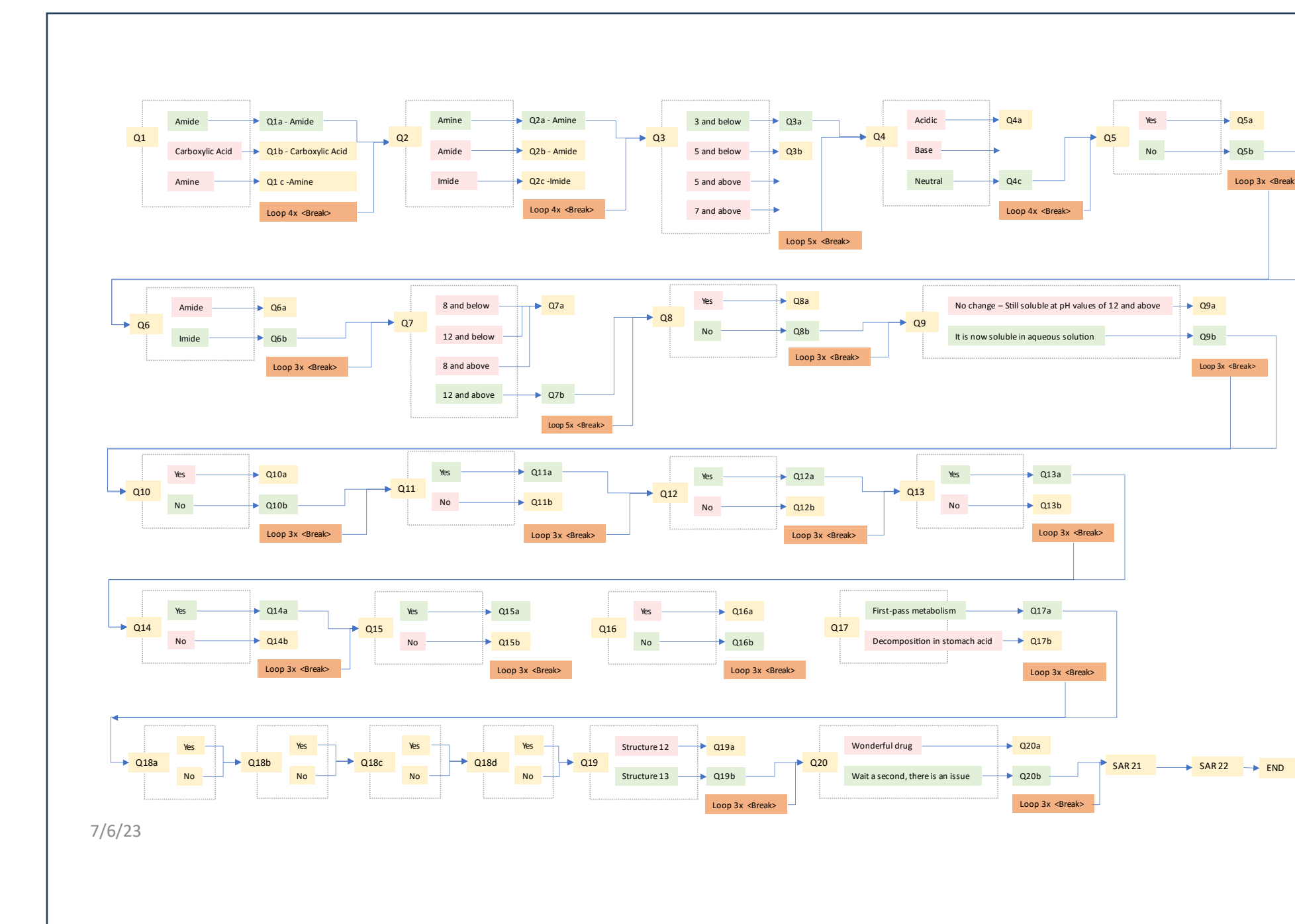
As a supportive initiative offered over the Winter break, the philosophy was that an asynchronous formative approach was required, but feedback was essential for student learning and growth. This led to the conclusion that a guided tutorial with both correct and incorrect answers giving feedback, hints, and explanations – with the aim of guiding all students to the end of the problem.

Content Development

Qualtrics was selected as the tutorial platform to limit technology barriers and support requirements over the winter break while maintaining the functionality to implement guided feedback and internal progress tracking.

The tutorial was designed to build in complexity: from simply recognizing functional groups to acid/base, solubility, route of administration, metabolism, approaches to hinder first-pass metabolism/extend the duration of action, to SAR, including QSAR.

As a student proceeded through the tutorial, suggestions and tips were incorporated to guide them toward the correct answer with a limited number of attempts. Full explanations were given with the correct answer to reinforce learning.



Guided Pathway

Example of Question

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We will walk through the process to answer the question "Would compound 1 make a good injectable drug?"...but where to start with such a question? – let's start by looking at structure 1 and determining the properties of each group.

Compound 1

Name the group at the **top left** of the structure (circled below).

☐ Amide
☐ Carboxylic Acid
☐ Amine

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An amine has a nitrogen (yes), but is not attached to the carbon of a carbonyl as in compound 1. Please try again.

Compound 1

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If Amide is chosen:

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A carboxylic acid does not have a nitrogen, the group at the top left has a nitrogen. Please try again.

Compound 1

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If Carboxylic acid is chosen:

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Correct, an amide has a nitrogen immediately attached to the carbon of a carbonyl. It is not a carboxylic acid (oxygen attached to that carbon of a carbonyl) or an amine (nitrogen not attached to a carbon of a carbonyl). Both a carboxylic acid and amine are shown here.

Carboxylic Acid

Amine

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If Amide is chosen:

Conclusions

Student success does not end with pre-matriculation programs, and continued approaches to provide support and preparation are critical to ensure confidence in students taking medicinal chemistry, a topic generally considered one of the most difficult in the pharmacy curriculum.

Discussion

The exercise built through the topics discussed (recognizing functional groups to acid/base, solubility, route of administration, metabolism, approaches to hinder first-pass metabolism/extend duration of action, to SAR including QSAR), but all followed the structure shown to the left. Correct answers included explanations (to allow for guesses) along with hints when choosing incorrect answers.

The planning for the exercise took significant effort to ensure the logic flow towards building complexity, incorporating additional concepts through the exercise.

The exercise was piloted by faculty in both basic science and practice, and feedback was incorporated. Examples include: 1) a simple “try again” with some incorrect answers is tempting in terms of workload, but was found to be frustrating for the user – some type of guidance is required; 2) circling of the functional group being discussed removed confusion for individuals who do not commonly think about structures and functional groups.