A Team Based Learning Approach for Instructing Medical Clerkship Students on how Neuroscience is Transforming the Treatment of Depression and Suicidal Ideation

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OBJECTIVE

Embed neuroscience teaching into psychiatry clerkship through a process that engages students in complex, real problem solving. The teaching session will demonstrate how basic and clinical research is transforming the treatment of depression.

BACKGROUND

- Psychiatry is a discipline of neuroscience and psychiatric disorders have a neurobiological basis. Yet, psychiatry continues to struggle with issues of stigma that prevent patients from seeking adequate treatment which in turn can lead to dire consequences.
- Medical students are great vehicles for bringing about positive change. Instilling in them a life-long appreciation of the tight link between neuroscience, brain research and psychiatry can help them become better clinicians/physician scientists and life-long ambassadors. They can then thoughtfully educate the public and future health professionals about how **psychiatric illnesses are, in fact, disorders of the brain.**
- YSM curriculum blends neuroscience teaching into Psychiatry in the first year very effectively but not as well in the rest of the curriculum.
- Clinical experience during clerkship exposes students to multiple psychiatric treatments and their merits/demerits – a fertile ground for blending neuroscience teaching with instruction on drugs in the pipeline.

METHODS

A TBL session based on discussion and decision-making will be used for the proposed learning exercise. The TBL session being developed has the following key features:

- **'Backward Design':** Decide what students should be able to do at the end of the session or clerkship. Then decide what they need to know.
- Session activities progress through **Bloom's levels** -remembering, understanding, applying, analyzing, evaluating and creating.
- **Knowledge acquisition/knowledge application process** is repeated several times during the session.

Groups

TBL session will be conducted in the last week of Psychiatry/Primary Care clerkship after students have seen and treated depressed patients in the clinic.

- The ~25 students will be divided into 4 teams. Teams will be pre-formed ensuring diversity with no obvious previous coalitions that threaten cohesiveness. Aim for long-standing groups.
- Two instructors –basic science expertise and clinical expertise. Meenakshi Alreja and Kirsten Wilkins.

Individual Study

- Convey to the students why a TBL session has been designed for this lesson.
- Emphasize the need for individual preparation.

Individual study:

- Review the 12-15 power point slides provided.
- Ask students to compile their thoughts on the merits, demerits and mechanism(s) of action of currently prescribed antidepressants.

Readiness Assurance

- Individual test - Multiple choice questions to individuals to confirm adequate review of assigned homework. Design 4-5 multiple choice questions. 10-12 min block.
- Group discussion and test. Discuss and come up with 4 or more properties of an ideal anti-depressant.
- Based on your knowledge of neurobiology suggest possible mechanisms a hypothetical new treatment could target.

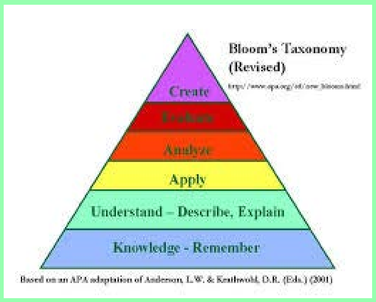
Instruction segment - Application of Concepts – complex, real problem solving

- Instruct for 10-15 min on a novel therapy involving NMDA receptors.
- Engage students by having them use the concepts they learnt to solve a relevant, interesting and significant problem - students will use the NMDAR model below to decide what binding sites could be targeted for effective treatments with minimal side effects.

TBL session

Learning Objectives for Individual Study

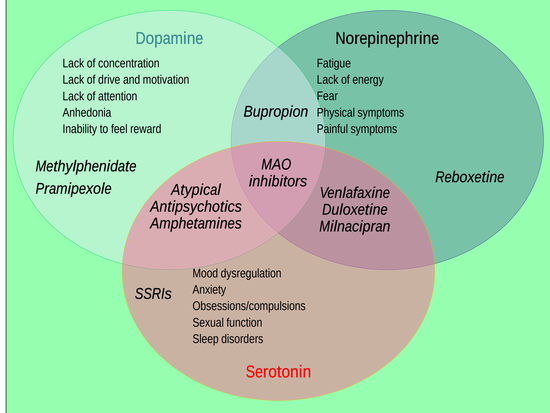
- Recount mechanism(s) of action of currently prescribed antidepressants
- State 3 major limitations of current antidepressant treatments
- State 3 major side effects of prescribed antidepressants
- Name two additional brain mechanisms that could be pursued to formulate new antidepressants



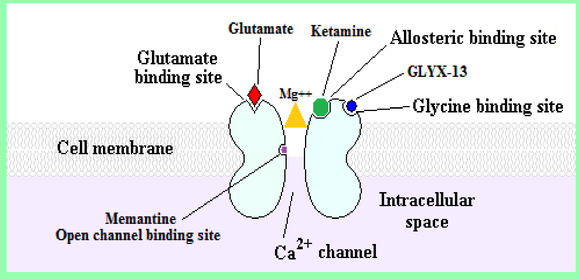
- Session activities proceed through Bloom's levels
- 'Backward Design'
- Repeated Knowledge acquisition/knowledge application process

Learning Objectives for Instruction Segment

- State the key findings that support targeting the glutamatergic system and NMDA receptor could be transformative for treating depression and suicidal ideation
- Use the NMDA receptor model below to speculate what binding sites could be targeted for developing treatment without major side effects
- Name an antidepressant in the pipeline with its mechanism of action.
- State two reasons - how the new drug could be useful or not



Most prescription antidepressants target the monoaminergic system



Novel antidepressants target the glutamatergic system – NMDA receptor

RESULTS

The TBL will be piloted on June 8th, 2015 in Hope 110 from 5 to 6:30 pm (dinner included!).

CONCLUSIONS

We have chosen a Team Based Learning approach for the proposed session as it will allow students to work in small groups, delve into a problem and help solve it through their knowledge of basic neuroscience and clinical psychiatry.

The proposed TBL is in line with the following '**Guiding Principles for Renewing the YSM Curriculum**':

1. ***Integration*** *Basic, clinical, and social sciences are integrated throughout all years of the curriculum. This requires that:*

   Basic scientists and clinicians plan and teach together to assure that the curriculum repeatedly emphasizes and demonstrates the importance of the basic sciences in understanding and practicing clinical medicine.

The TBL session will achieve the following **'Overarching Goals of the Curriculum'**

2. Mechanisms and Treatment of Disease

Students acquire knowledge at the molecular, cellular, organ-system, whole body, and societal levels, and integrate this knowledge with clinical science and skills to diagnose and treat disease.

8. Physician as Scientist

Students learn to approach medicine from a scientifically minded perspective and are educated and mentored by leading scientists. This prepares them for careers in biomedical science and as medical practitioners, and to become the next generation of medical scientists and leaders in academic medicine.

REFERENCES

The Essential Elements of Team-Based Learning Adapted from Chapter 1 of Michaelsen, L., Sweet, M. & Parmalee, D. (2009)*Team-Based Learning: Small Group Learning's Next Big Step*. *New Directions in Teaching and Learning*, 7-27.

ACKNOWLEDGEMENTS

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