Team-building session

Department of Biological Engineering TA Training

Even-numbered teams should begin with the reflective exercise, while odd-numbered teams begin with the chalkboard exercise (over). After 30 minutes, please switch.

Reflective exercise

The questions below are intended to help you explore your attitudes and goals regarding teaching. Discuss them as a group to see what common issues arise, and consider discussing these with your TA mentor over lunch.

If you have time now, or else later this week, try making a list (individually or together) of 3 key dos and don'ts that you want to strive for in your teaching this year.

Remember that when it comes to teaching, energy in = energy out. Your students will take notice if you are both prepared and engaged, and ideally your behavior will be contagious!

1) Who is one of the best teachers you ever had? What did s/he do that was particularly effective?
2) Describe a class in which an instructor *didn't* contribute to (or even actively impeded!) your learning.
3) What concerns you most about teaching MIT undergraduates/graduate students? What excites you most about the opportunity to TA?

Chalkboard exercise

As a team, please transform the information below into 2-3 boards of instructive text and diagrams. Each of you should get a chance to write and/or draw to get a feeling for the physical space. Afterward, be sure to look at your boards from the back *of the room to see if everything is big enough. If you have time, compare your approach with another group's. At the 20-min mark, one or more instructors will come around and give you feedback as well.*

- A major goal in the drug delivery field is sustained release. Drug load should consistently lie in the space between toxicity and efficacy.
- Main considerations when designing a drug delivery system: carrier, cargo (drug), delivery method, and some knowledge of the drug target and/or mechanism.
- Cargo examples: small molecules, DNA, siRNA, and proteins.
- Delivery examples: oral, transdermal, injection.
- Most common carrier type: degradable polymer.
- Drug release may occur by either bulk erosion or surface erosion of polymers.
- Surface erosion rate is proportional to surface area of the material, which can be designed to be constant and thus yield zeroth order kinetics.
- Bulk erosion rate is proportional to the carrier volume, which cannot be designed to be constant. Therefore, kinetics are unpredictable. In the worst case, there is no release for a long time, followed by a high-concentration burst of drug.
- Erosion type may be predicted and controlled according to three main features of the carrier polymer: dimensions, chemical degradation rate, and diffusion coefficient of water. As degradation increases or diffusivity of water in the polymer decreases, surface erosion is favored for a broader range of carrier dimensions.