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Using Narrative to Enhance Learning in the Basic Sciences

To draw analogies between complex unfamiliar topics and simple known processes is a natural component of education. Science lecturers often open their talk**s** with a comparison to a familiar process (the nervous system is like the telephone; the endocrine system is like the pony express). Our approach to the basic sciences builds upon this simple idea – we have developed narrative analogies for nearly the entire second year curriculum. We use stories, with characters and humor, to help learn and recall volumes of basic science information. By remembering one aspect of a character, we can predict
the related physiology, so that the stories and science 'make sense'. Integral to the creative process is pleasure, and most amazingly, that is what we have added to our studies this year.

The stories are useful for three separate kinds of learning: to enhance name recall, to illustrate mechanism, and to associate seemingly random pieces of information. As an illustration of the first two points, each drug in pharmacology is assigned a character that closely associates with both the name and function. In anti-fungal drugs, to make ergosterol (as opposed to cholesterol) which is incorporated into the cell membrane, **squalene** is converted to **lanosterol** which is then converted to **ergosterol**. This is likened to a **squealing** pig mother giving birth to a new baby on **land**. This baby grows up to be a pig that **ergs** his parents on. So those anti-fungals that prevent the conversion of squalene to lanosterol are represented by things that interfere with birth, and those anti-fungals that prevent the conversion of lanosterol to ergosterol are represented by characters that will not grow up. As an example of the latter, **Ketoconazole** is Ferris Bueller ("the **key to con**ning your parents…"), while **Econazole** is Willy Wonka the great **economist**. Creating stories, which are necessarily plot-driven, forces us to address the underlying mechanism. To create, read and retell this story entails no rote memorization of listed events. Instead, the creative process helps us to learn it once and learn it well.

The third function of the stories is to associate seemingly random pieces of information and act as a memory aid. For example the function of the interleukins (IL-1, IL-2, etc.) and their interactions are complex. We created an cytokine grocery store with aisle (IL) 1, 2, 3, etc. On each aisle of the store you can find items that will remind you of the interleukin's function. Aisle 1 and 6 have spicy food because both IL-1 and IL-6 are associated with fever and acute reactants. Aisle 1 is also the dairy aisle because IL-1 arose from macrophages and macrophages resemble eggs. This is also useful in learning drug side effects or symptoms of disease. While graphics help the stories come alive and remain in our heads, they are but one part of the total concept. The stories enable one to absorb material in an almost global sweep.