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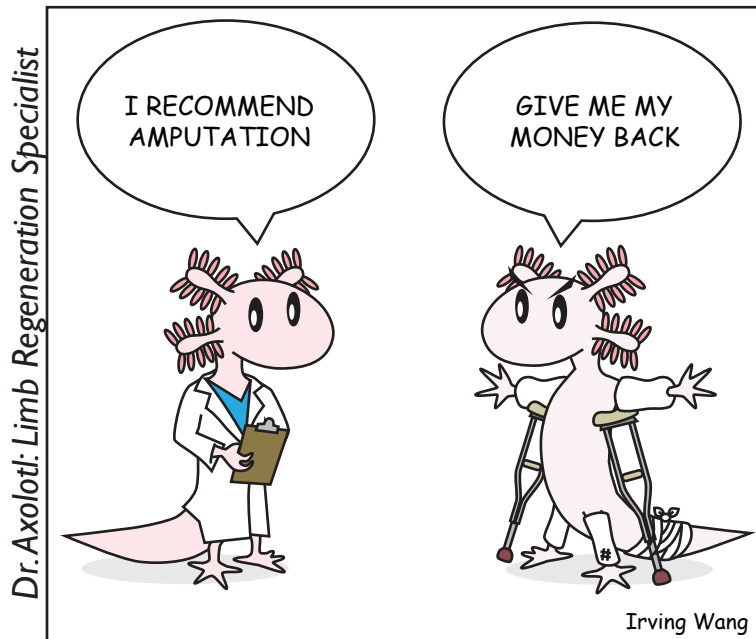
# Issues of Commitment

## *The Hows and Whys of Stem Cells*

(A Fall 2013 Advanced Undergraduate Seminar)

*Tuesdays 11am-pm (class time is flexible)*

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Most animals begin life as a single cell: the fertilized egg, or zygote. The zygote is able to generate all other cells and tissues that later make up the adult organism. However, by the time the adult body plan is in place, most of the cells that make up the organism are unable to divide, and the remaining dividing cells are usually much more restricted in their fates. Nevertheless, most adult animals maintain some adult stem cells that are able to divide and self-renew. Some species have pluripotent adult stem cells that are able to replace essentially any type of tissue. Other species, such as humans, have adult stem cells with highly limited potential, i.e., they are lineage-restricted stem cells. Still other animals, such as nematodes (e.g., *C. elegans*), have no adult somatic stem cells. In this course we will explore three main topics concerning animal stem cells. First, we will address what it means to be a stem cell by studying molecular investigations of adult stem cells in diverse animals ranging from jellyfish to humans. Second, we will compare the features of adult stem cells to those of other multipotent cells, such as early embryonic cells, and discuss similarities and differences among multipotent cells at different stages of life. Third, we will evaluate how and why different animal groups have evolved the ability to maintain pluripotent vs. lineage-restricted adult stem cells. For example, we will consider why humans have evolved to maintain only lineage-restricted stem cells, given that pluripotent adult stem cells would appear to give so many advantages.

*Students will obtain a deep understanding of the main concepts and questions concerning stem cell biology, become familiar with current research methods in the field, and learn to evaluate critically the design of experiments used in these studies.*