

The Doctor's Corner: An Introduction to Flow Cytometry



What is flow cytometry?

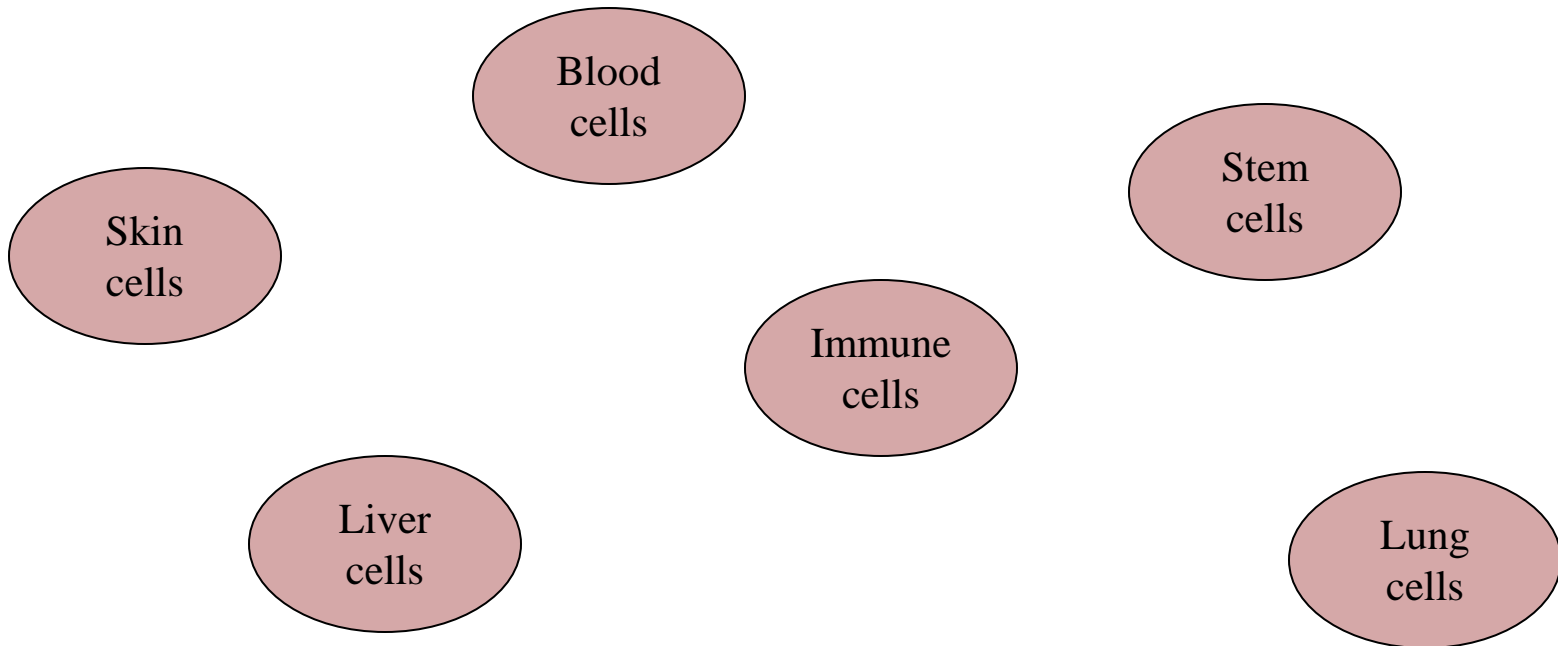
Flow cytometry 'sorts' and 'categorizes' different types of things



What is flow cytometry?

Flow cytometry sorts cells

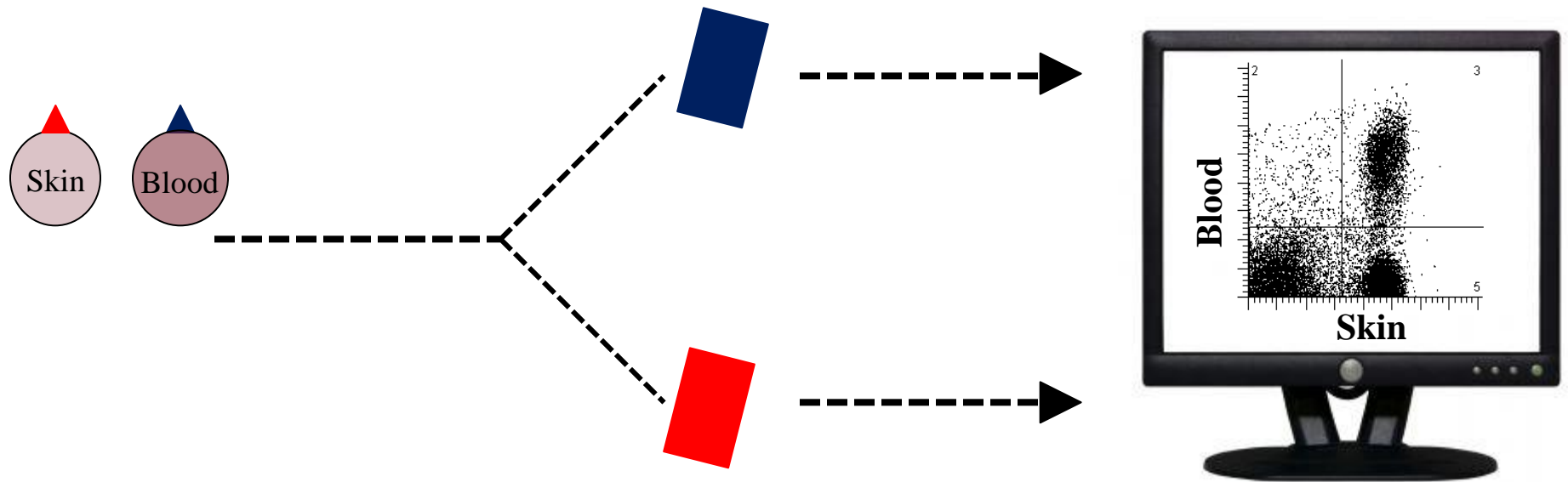
What are different types of cells?



How does it work?

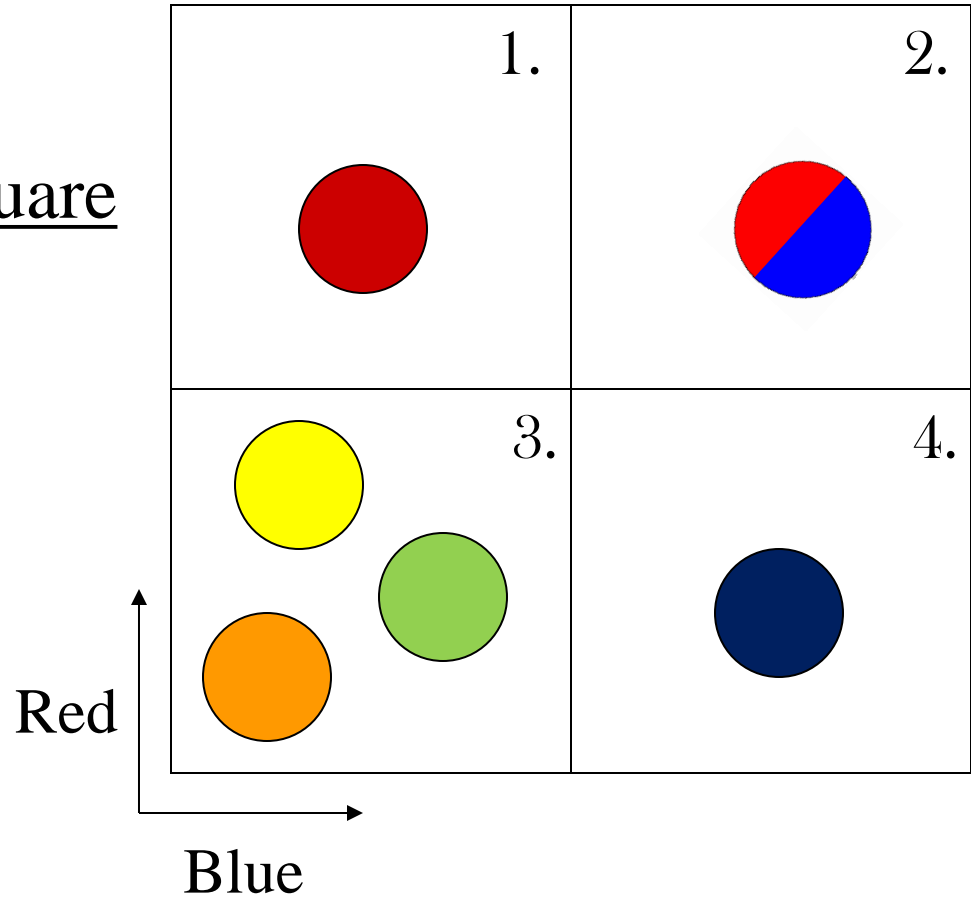
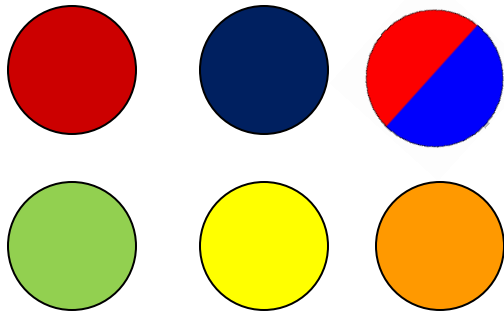
How do we tell the cells apart?

We put fluorescent markers on them – a flow cytometer ‘sorts’ the cells by what color they are



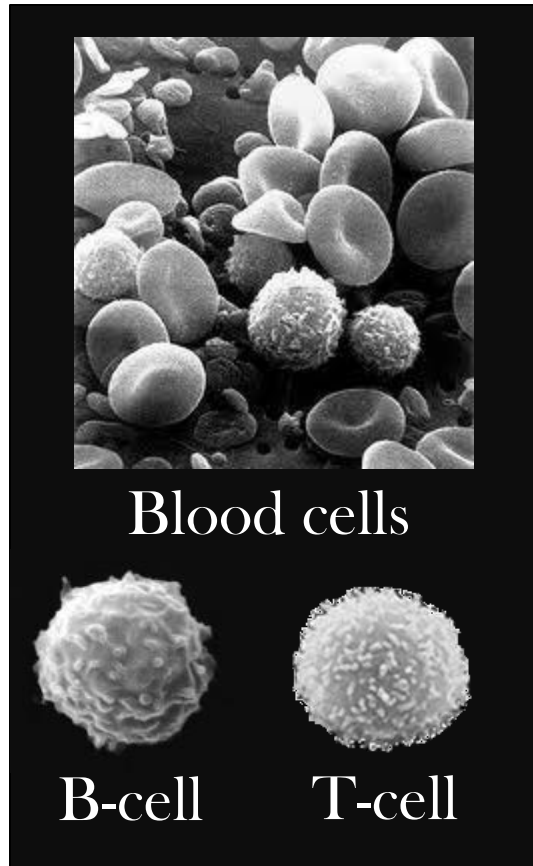
Activity

Flow Cytometry Four Square

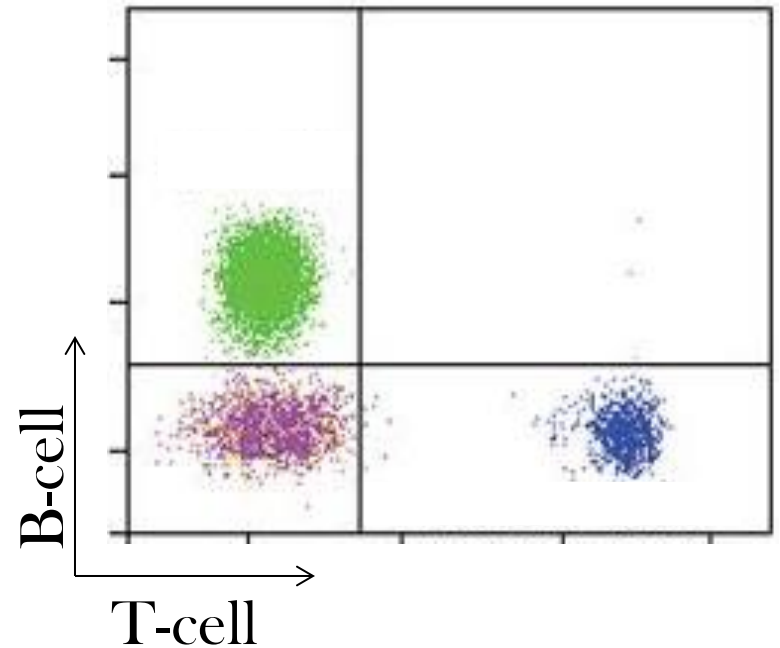


Why use flow cytometry?

Microscopy



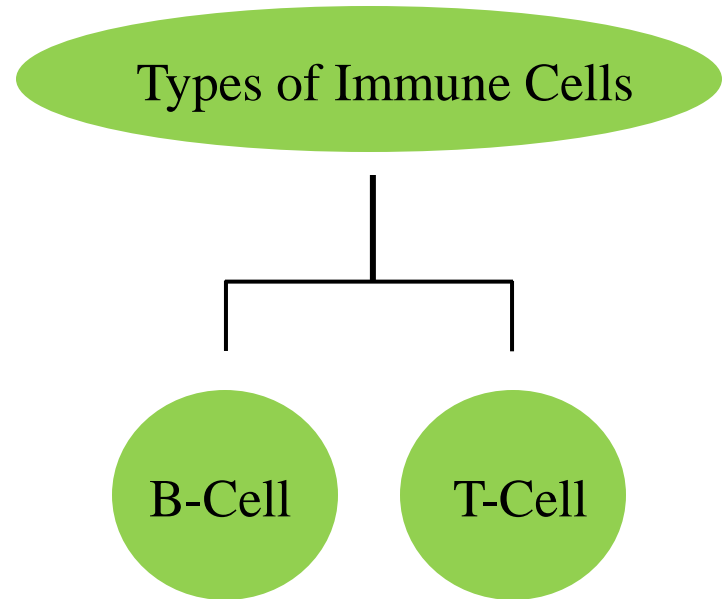
Flow cytometry



The Immune System

How the immune system works

Immune cells are like little soldiers, fighting off bacteria



The Doctor's Corner

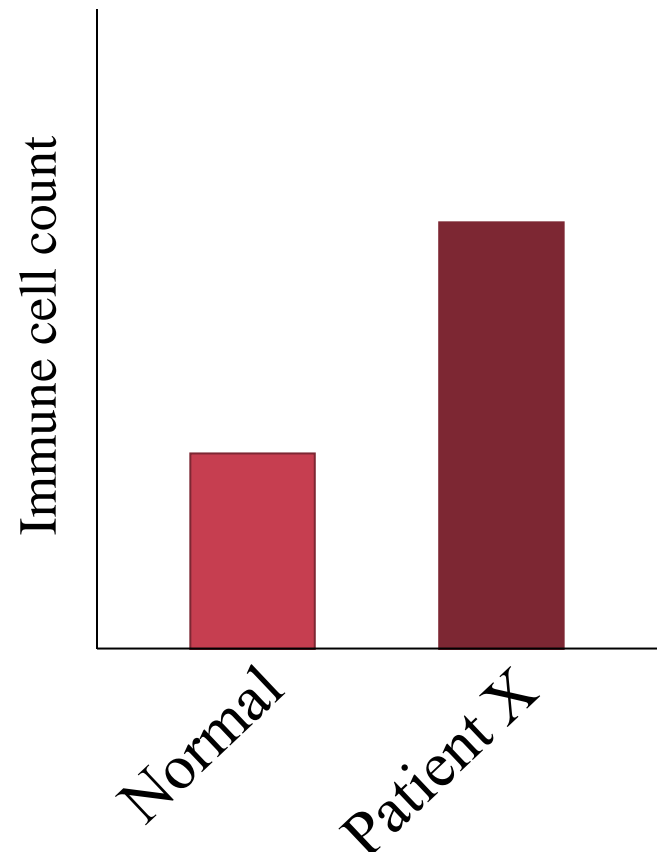


Doctors use flow cytometry to help diagnose patients

The Case

Patient X comes in complaining of a fever, sore throat and white spots on his tongue.

You run a blood test and find that Patient X has increased immune cells



Activity

Potential Diagnosis:

Mononucleosis

Caused by B-cells

Fever
Sore Throat
White spots on throat
and tongue

Strep Throat

Caused by T-cells

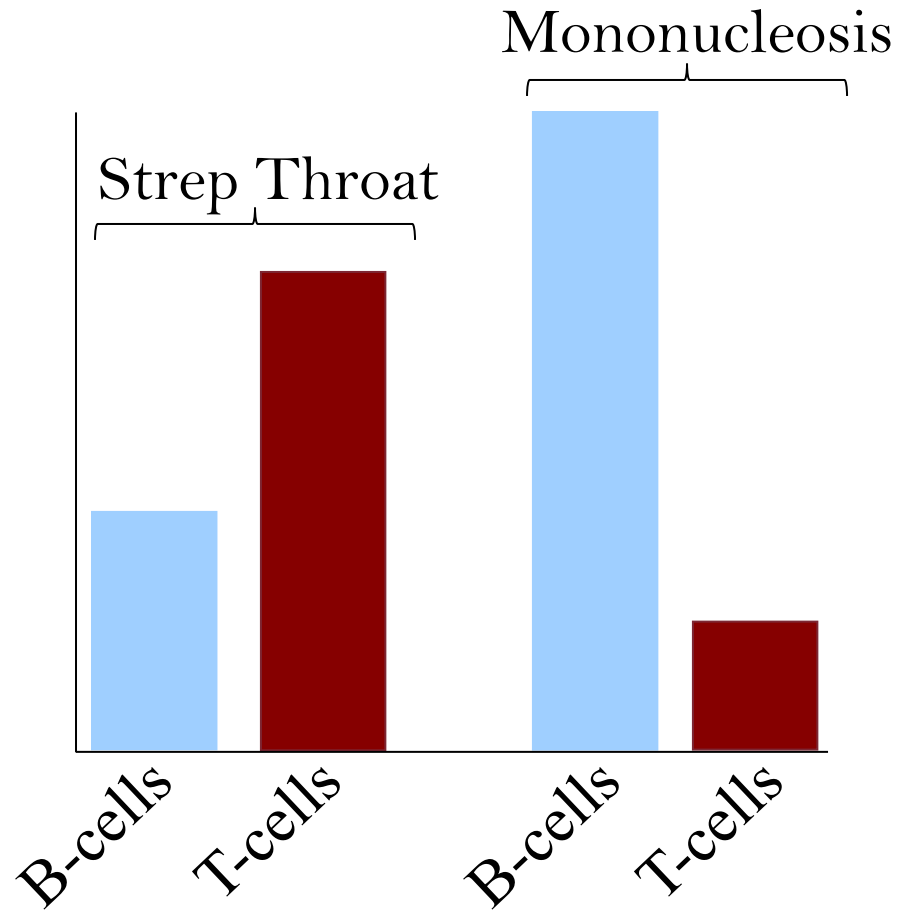
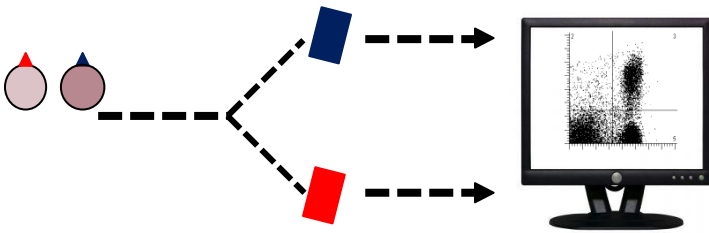
Fever
Sore Throat
White spots on throat
and tongue

Activity

Potential Diagnosis:

Determine if patient X has more B-cells or T-cells

We can use flow cytometry to sort the B-cells and the T-cells

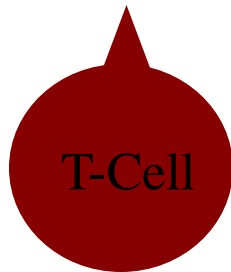
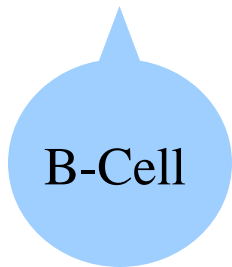


Activity

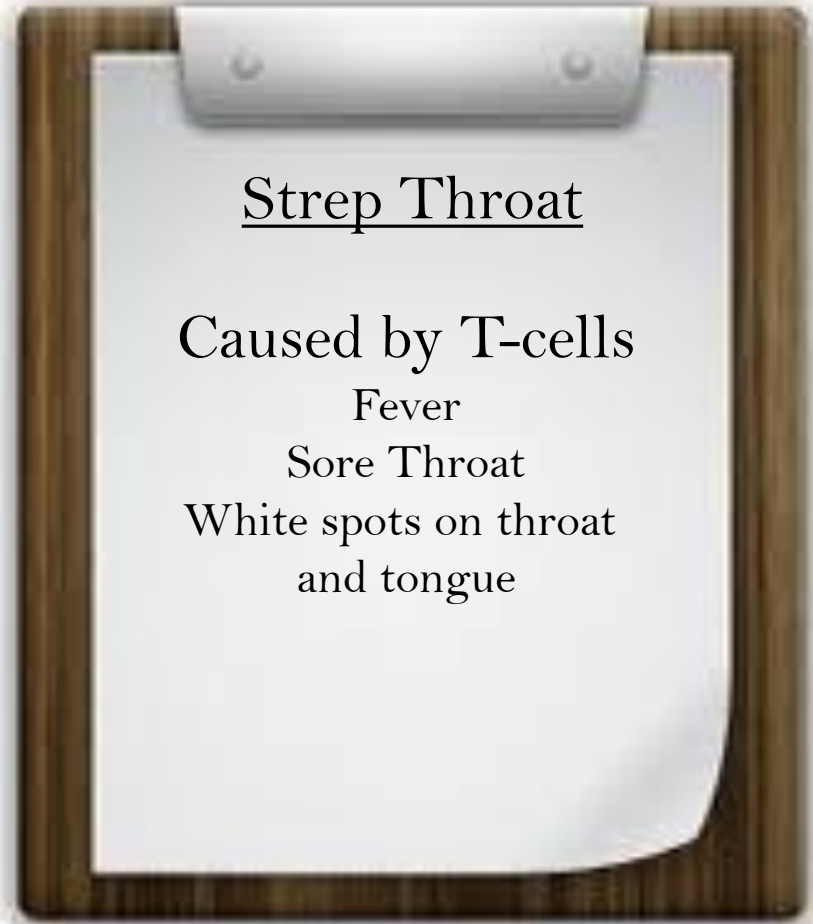
We add fluorescent tags that recognize either a B-cell or a T-cell

B-cell – fluoresce blue

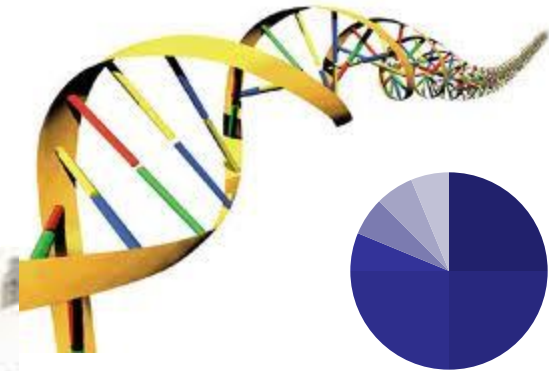
T-cell – fluoresce red



B-cells



Jobs in flow cytometry



Summary

Yanni the Yeast: Using dose response assays to evaluate household chemicals

Using yeast as a model system, students can evaluate the toxicity of household chemicals such as salt, Comet and dry milk. Concepts: Toxicity, dose response, graphing

Mass Spectrometry: Concepts of mass and weight

To understand how mass can be used to sort chemicals, the students sort M&Ms by mass. A model of a mass spectrometer shows students how objects are sorted based on their mass.

The Doctor's Corner

In this activity, students role-play as doctors, using flow cytometry to diagnose a fictional patient.