



Clinical Laboratory Scientists



**Who Are They?
&
What Do They Do?**



What is Clinical Laboratory Science?

Clinical Laboratory Science is the “Nerve Center” of medicine.

- Think about the last time you had a really bad sore throat.
- If you went to the doctor, you probably had your throat cultured (the cotton swab rubbed on the back of your throat.)
- That culture was then taken down to the lab and the Clinical Laboratory Scientist was the person who identified which “bug” was causing your sore throat.
- All samples taken by a Doctor, Nurse, or Phlebotomists are analyzed by a Clinical Laboratory Scientist.
- Without the Clinical Laboratory Scientist, Doctors would not be able to diagnose diseases properly or treat patients effectively.



Clinical Laboratory Science



**Clinical Laboratory Scientists
(CLS's) are not all mad scientists
in white lab coats working in
dark and dingy labs!**



Clinical Laboratory Science

Today's CLS is likely to be found in modern, bright surroundings using the latest state-of-the-art equipment.





Clinical Laboratory Scientists

- CLS's perform laboratory tests in conjunction with pathologists and other physicians or scientists who specialize in clinical chemistry, microbiology, or other biological sciences.
- The job of the Clinical Laboratory Scientist may consist of identification of organisms causing infections, counting and classifying blood cells, operating chemistry analyzers, performing immunological tests, or typing and crossmatching blood for transfusion.





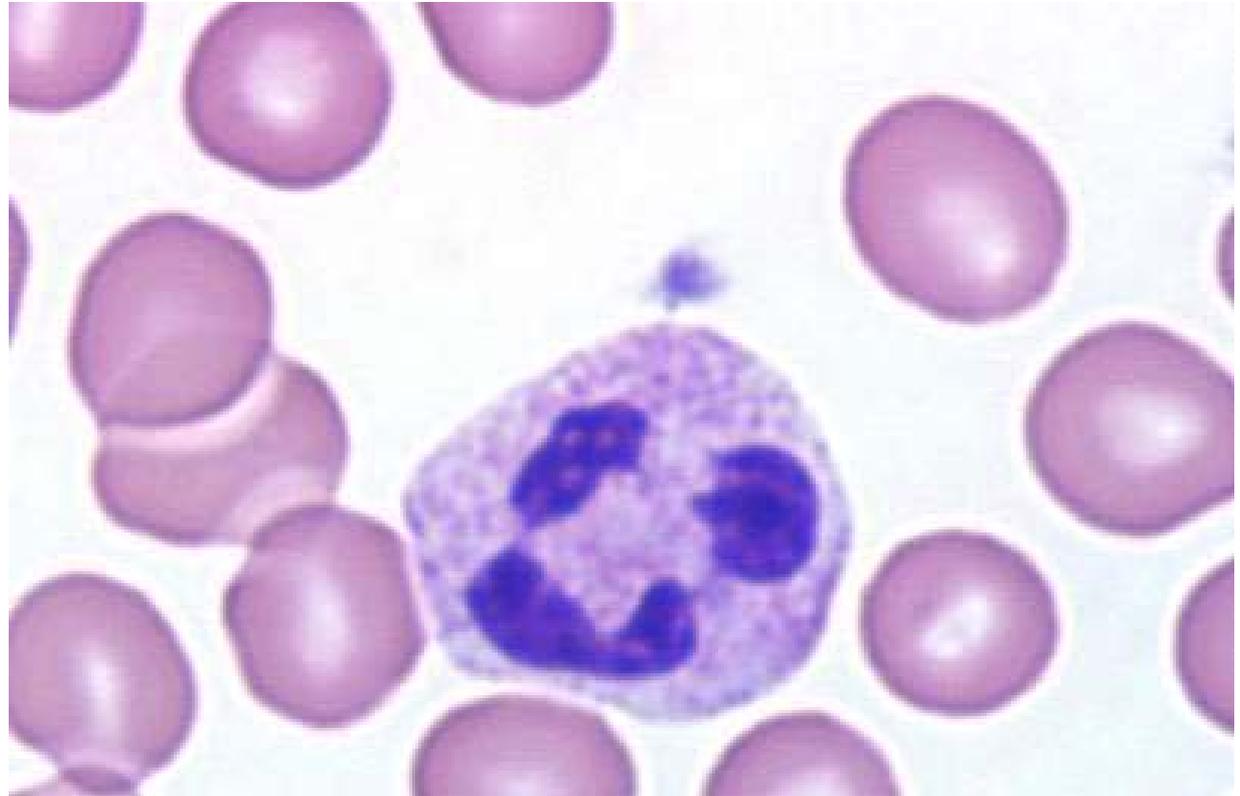
CLS's Help to Save Lives

- Here are just two examples of how the CLS provides valuable information to the health care team.
 - **Crossmatching Blood**
 - A laboratory test in which volunteer donor's red blood cells are mixed with the patient's serum to determine whether the donor's cells will most probably survive in the patient's circulation after transfusion.
 - **Immunology**
 - The scientific study of the functions of the body which provide immunity to disease. It often involves looking for antibodies to foreign substances in the patient's blood.

What a CLS might see under the microscope:



In this picture of blood, there are red blood cells and one white blood cell. Red blood cells (pink discs seen here) are special cells that contain the protein hemoglobin, which allows them to pick up and transport oxygen from the lungs to release it deep into the tissues via our circulatory system.



<http://www.kyoto-u.ac.jp>

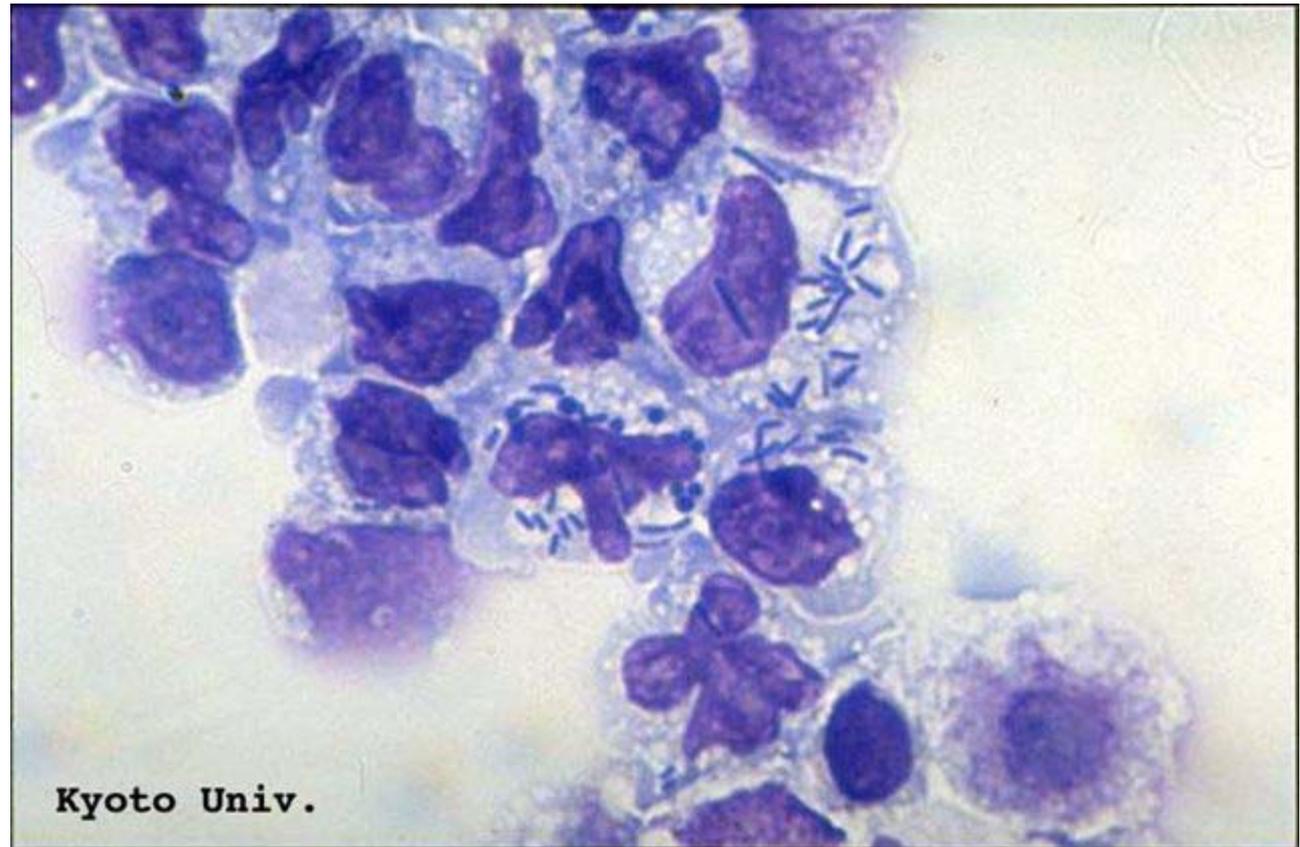
In this picture, the seg is the large cell with the lobular purple nucleus (the nucleus is segmented, hence the name seg) and the cytoplasm is filled with rose-violet granules.



Under the Microscope: White Blood Cells

Segmented Neutrophilic WBC phagocytizing rod shaped bacteria.

To the right you can see 3-4 centrally located neutrophils (aka polymorphonuclear leukocytes and segs.) These neutrophils contain numerous ingested rod-shaped bacteria..





Under the Microscope: Malaria

Malaria-Plasmodium falciparum parasite inside red blood cells

Malaria is the infection of our red blood cells with a microscopic parasite. It is transmitted to humans through the bite of an infected mosquito, primarily in tropical climates (see red-purple dots on rings inside the red blood cells).

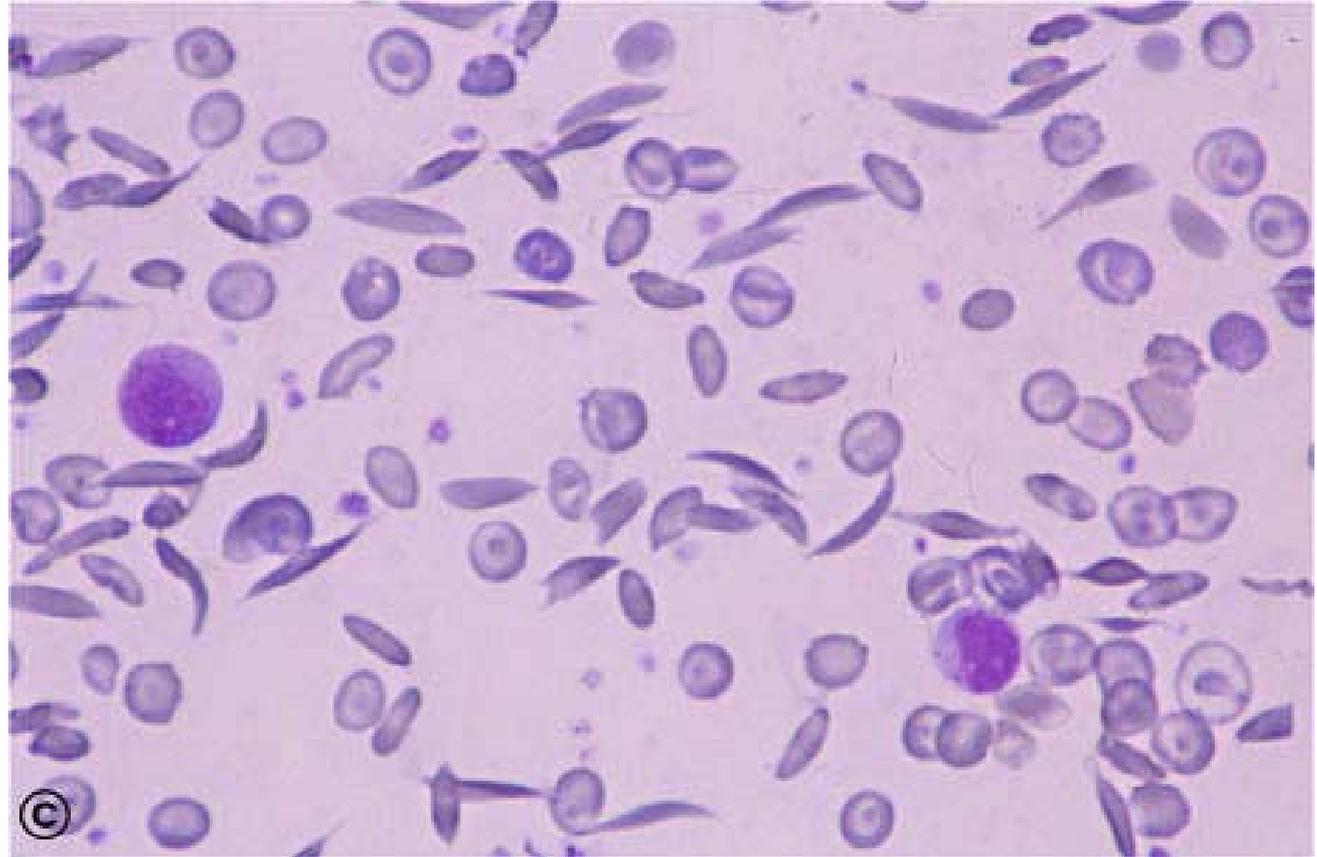


The infected red blood cells rupture when the parasite matures and fever, chills and possibly organ damage can result if the infection is heavy enough.



Under the Microscope: Sickle Cell Anemia

Sickle Cell Anemia is a genetically inherited disease in which the hemoglobin of the person's red blood cells are mutated. Under certain stressful conditions, the hemoglobin crystallizes and the red cell forms a sickled shape.



Sickled cells cannot fit through tiny capillaries in our bodies and damage to these small veins and capillaries and organ damage can occur as a long term result of being born with this disease.



Clinical laboratory Science Disciplines

- **Hematology** - the study of blood cells
- **Hemostasis** - the study of the clotting mechanisms of the blood
- **Immunology** - the study of the body's defense mechanisms
- **Immunochemistry** - the immunology of blood cells. Involves providing compatible blood for transfusion
- **Chemistry** - the study of chemical constituents of the blood and other body fluids
- **Microbiology** - the study of microorganisms including bacteria, viruses, parasites, and fungi



Role of the CLS

- Perform Laboratory analyses
- Evaluate and correlate test results
- Monitor quality
- Troubleshoot problems
- Communicate with the healthcare team
- Research
- Management and Consulting
- Education



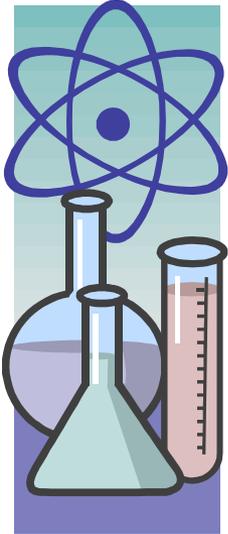
Clinical Laboratory Science Career Options



- Clinical Laboratory Science is a dynamic profession!
- With a Baccalaureate degree in Clinical Laboratory Science, you could go into numerous careers:
 - Hospital Laboratories
 - Physician Office Laboratories
 - Research Assistants
 - Reference or Industrial Laboratories
 - Forensic/Crime Labs
 - University Laboratories
 - Pharmaceutical Companies
 - Lab Supervisor or Manager
 - Laboratory Educator
 - Diagnostic Medicine Quality Control
 - Epidemiology Veterinary Medicine
 - Infection Control



Clinical laboratory Scientists...



- **Enjoy the sciences**
- **Enjoy working with sophisticated equipment**
- **Enjoy helping others**
- **Like to solve problems**
- **Like challenges and responsibility**
- **Are accurate and reliable**
- **Work well under pressure**
- **Are great communicators**
- **Are great team members**
- **Have high standards**



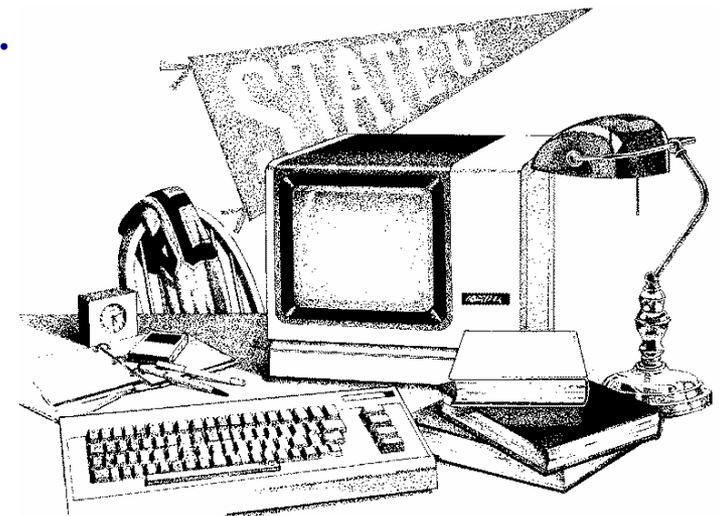


Education

College - Why go?

- On average, the person who goes to college earns 25% more than a person who does not go to college.
- The more education you have, the more job choices you'll have.
- While in college, you will gain knowledge and skills that you will use for the rest of your life.

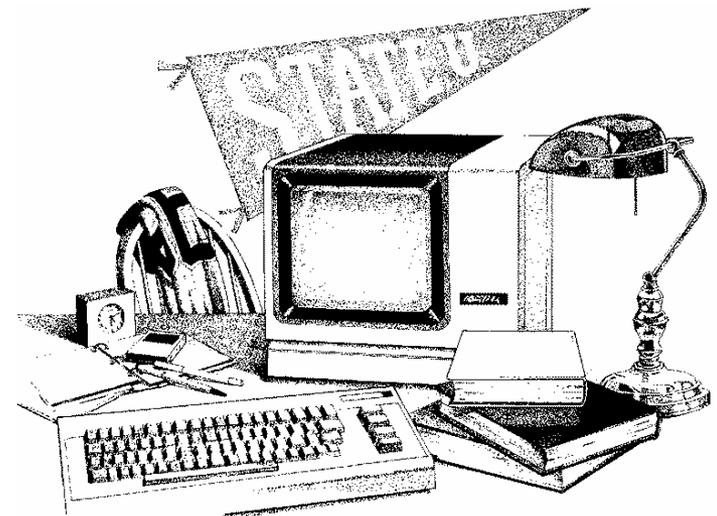
<http://www.choosenursing.com>





CLS Educational Requirements

- A Baccalaureate degree from a regionally accredited college/university with courses in biological science, chemistry and mathematics
- 1 year of professional/clinical education





Opportunities Await!

The Clinical Laboratory Scientist is in **DEMAND!**

Factors influencing the increasing demand for clinical laboratory services:

- “Approximately 80% of all diagnostic decisions are based on laboratory results produced by Clinical Laboratory Scientists”
(www.wls.edu/readstory/newsinfo).
- The U.S. Bureau of Labor Statistics reports that 9,000 clinical lab scientists will be needed each year for the next 10 years, but the nation’s clinical laboratory science education programs are graduating half that number (www.wls.edu/readstory/newsinfo).



Opportunities Await!

The Clinical Laboratory Scientist is in **DEMAND!**

Factors influencing the increasing demand for clinical laboratory services:

- Twenty years ago there were 80 schools in California producing 200 CLS graduates each year.
- Today, that number has declined to seven schools generating only 40 graduates.
- The current average age of the CLS is between 40 - 55. This aging workforce will soon embrace retirement in record numbers.
- Many labs are open 24 hours a day, seven days a week, giving people the option of working full or part time and in a variety of shifts.
- **The shortage of Clinical Laboratory Scientists is not going to go away, making job opportunities in this field abundant and secure.**



Opportunities Await!

The Clinical Laboratory Scientist is in **DEMAND!**

“An education in clinical laboratory science affords the academic, attitudinal and skill base for numerous other educational and career opportunities. Alumni find positions in research, biotechnology, forensics and pharmaceutical sales. It also provides excellent preparation for medical school, law and public health” (www.slu.edu/readstory/newsinfo/989).



Clinical Laboratory Scientists

Thank you for letting me speak with you today!



Questions.....?

Many thanks...

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