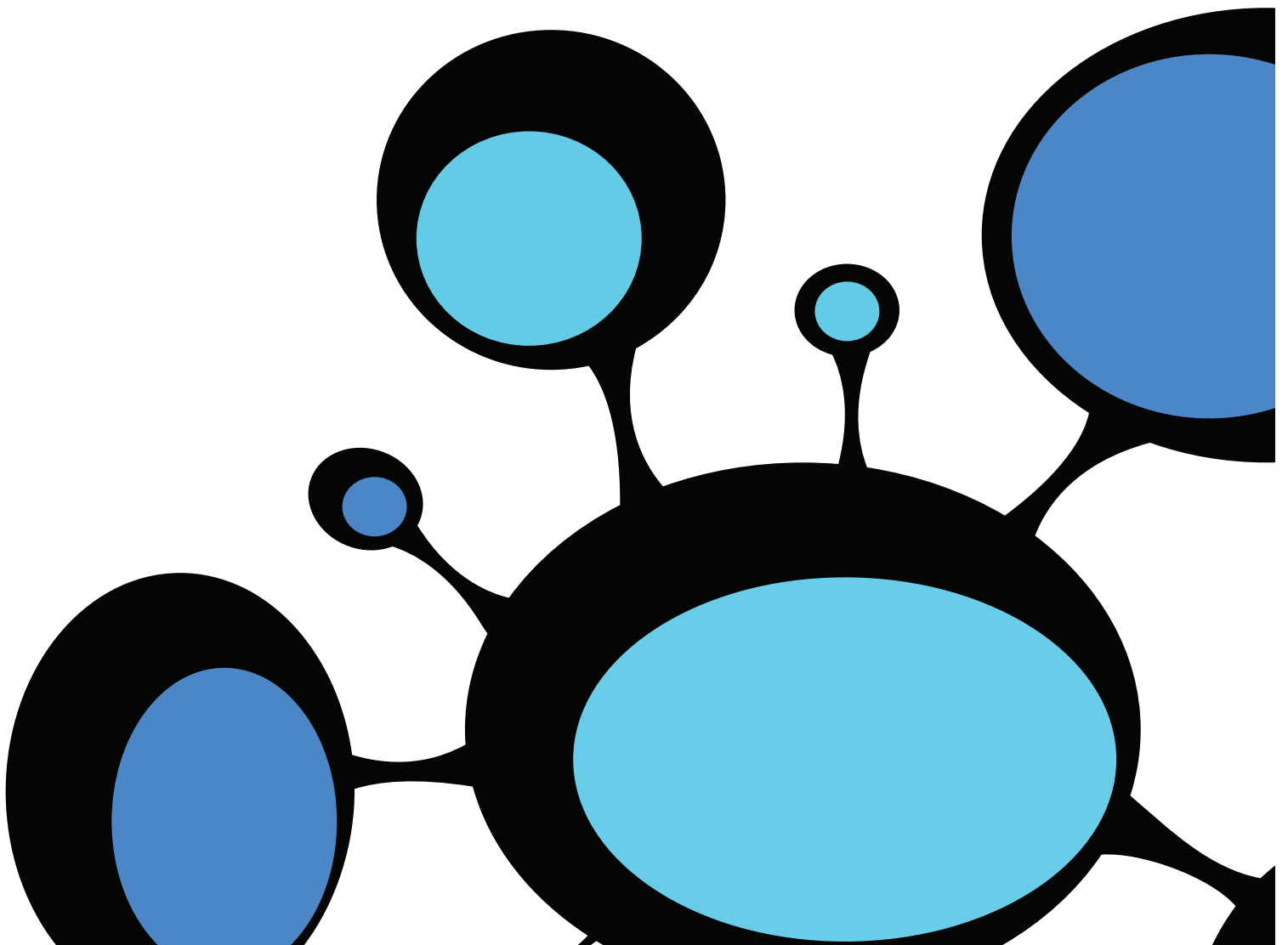


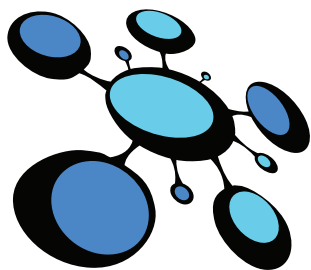


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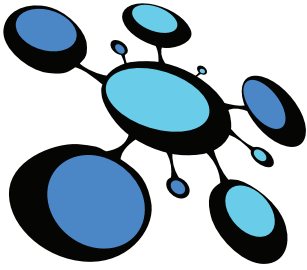
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SCHEDULE OF EVENTS

8:30 – 9:00 a.m.	Student Arrival and Packet Distribution Submit Talent Release Forms Students Take Pre-Survey
9:00 – 9:05 a.m.	Dr. Carol Messer, TCC Southeast Campus Provost <i>Welcome to Tulsa Community College!</i>
9:05 – 9:15 a.m.	Dr. Diana Spencer, Biotechnology Instructor/Coordinator <i>Introduction to TCC Biotechnology</i>
9:15 – 9:40 a.m.	Heith Crosby , PharmD, BCPS, CGP, FASCP <i>Pain Reception and Control</i>
9:40 – 10:05 a.m.	Steven D. Hartson, Ph.D. <i>Hsp 90 Inhibition and Anti-Cancer Therapy</i>
10:05 – 10:15 a.m.	Break
10:15 – 10:40 a.m.	Julie Marino, Ph.D. <i>Gene Expression During T-cell Development</i>
10:40 – 11:05 a.m.	R. Thomas Glass, D.D.S., Ph.D. <i>Dental Disease Transmission and Forensic Dentistry</i>
11:05 a.m. – 1:00 p.m.	Rotation – Lunch and Learn OR Biotechnology Activities Lunch and Learn Lyn Kent, Interim Associate Dean, College of Mathematics and Science, Southeast Campus <i>Welcome and Introduction to TCC Student Services</i> Aaron Ballinger, Student Recruiter <i>TCC Admissions, Enrollment, Tulsa Achieves, ACE, Tour of SE Campus</i> **Lunch prepared by Bill and Ruth's The Hub Biotechnology Activities Student explorations will include DNA extraction, gel-loading, DNA banding-pattern analysis, Genomics to Proteomics, and polyacrylamide gel analysis Group A: Green Genomes Lunch and Learn 11:10 to 12:00 p.m. Biotechnology Activities 12:10 to 1:00 p.m. Group P: Purple Proteomes Biotechnology Activities 11:10 to 12:00 p.m. Lunch and Learn 12:10 to 1:00 p.m.
1:00 – 1:10 p.m.	High School Faculty and Students Complete Evaluations & Load Buses



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PRESENTERS

Heith Crosby , PharmD, BCPS, CGP, FASCP

Research Assistant Professor

Oklahoma State University - Center for Health Sciences, Department of Anatomy and Cell Biology

Dr. Heith Crosby received his Doctor of Pharmacy Degree from Southwestern Oklahoma State University. He is a Ph.D. candidate in Pharmaceutical Sciences with an emphasis in pharmacology from the University of Oklahoma, College of Pharmacy and anticipates graduating this year. In addition, he is board certified in pharmacotherapy and is a fellow of the American Society of Consultant Pharmacists. The focus of his research is examining glutaminase inhibition and its relationship with analgesia.

Steven D. Hartson, Ph.D.

Associate Research Scientist

Director, Recombinant DNA/Protein Resource Facility

Oklahoma State University, Department of Biochemistry and Molecular Biology

Dr. Steven Hartson graduated from Oklahoma State University with a Bachelor of Science in Biochemistry in 1985, and later received his Ph.D. in Biochemistry, also from Oklahoma State University. Dr. Hartson's long-time research on Hsp90 (Heat shock protein 90) has contributed to the foundation for investigating Hsp90 inhibitors for anti-cancer therapy. Under the direction of Dr. Hartson, the Recombinant DNA/Protein Resource Facility at Oklahoma State University completes approximately 20,000 molecular analyses annually. His consultation to faculty, students, and technicians provides practical applications for using the facility resources to enhance research.

Julie H. Marino, Ph.D.

Instructor, Department of Surgery, University of Oklahoma - Tulsa

School of Community Medicine

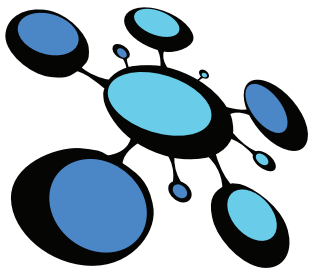
Dr. Julie H. Marino received her Bachelor of Arts in Biology from Covenant College before completing her PhD in Immunology at the University of Tulsa. She completed her post-doctoral training in the Department of Surgery at the University of Oklahoma, Tulsa, prior to accepting a position as an instructor in the Department of Surgery at the University of Oklahoma, School of Community Medicine, Tulsa. Dr. Marino's research focuses on gene expression during T cell development, specifically utilizing RT-PCR and microarray technology. Her recent publications have focused on the role of cytokines in regulating thymopoiesis. She is active in teaching graduate and undergraduate students at multiple universities, as well as teaching and mentoring medical students in basic research at the OU School of Community Medicine.

R. Thomas Glass, D.D.S., Ph.D.

Professor of Forensic Sciences, Pathology and Oral Medicine

Adjunct Professor of Microbiology, Oklahoma State University – Center for Health Sciences

Dr. Tom Glass holds a D.D.S. degree from Emory University and a Ph.D. in Pathology from the University of Chicago. He served as Chief Forensic Odontologist for the State of Oklahoma for 23 years during which time he developed a strategic plan for post-disaster victim identification. This plan was implemented by his team to identify victims from the Murrah Federal Building Disaster. Dr. Glass was named Professor Emeritus of Oral Pathology at the University of Oklahoma, Health Sciences Center in 1996. He is a Board-certified Oral and Maxillofacial Pathologist and retired from private practice in May, 2005. He is widely published in prominent dental and medical journals, and has authored several textbooks. Since 1999, Dr. Glass has been at Oklahoma State University, Center for Health Sciences, where he serves as Professor of Forensic Sciences, Pathology, and Dental Medicine an Adjunct Professor of Microbiology. Dr. Glass' research on Chronic Fatigue Syndrome, AIDS, Forensic Dentistry, and disease transmission by toothbrushes and other dental devices like dentures and athletic mouth-guards has gained international recognition.



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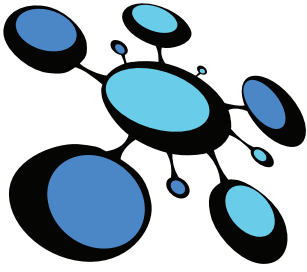
Biotechnology can be defined as the use or manipulation of living systems for the manufacture of products beneficial to the public. Right now, biotechnology is all around us. A recent boom in the field is responsible for products utilized in health care, agriculture and for protecting the environment.

At doctors' offices, hospitals and laboratories, biotech breakthroughs have provided more efficient and more accurate tests for diagnosing disease, and new and improved drugs for the treatment of disease. Agriculture has also greatly benefited from biotechnology. The grocery store shelves are literally stocked with products developed by biotechnological processes. New varieties of plants have been created that greatly increase crop yield and quality. And in the future, more nutritious crops will be available for the prevention of nutritional deficiencies worldwide. Awareness about environmental issues has fostered the development of biotech products that protect the environment. New plant varieties have been created that reduce the amount of fertilizers, pesticides and herbicides applied to crops. Decomposition and detoxification of harmful wastes and chemicals is being achieved through biotechnology.

Biotechnology benefits our society in many ways. The success of biotech breakthroughs has paved the way for continued expansion in the industry. Because biotechnology encompasses many disciplines, and because the industry and job market will continue to expand, there is likely a career for you. So you might be asking, "What can I do with a background in the field of biotechnology?"

Opportunities for careers in research and development include laboratory technician, research associate, and with continued education you could become a research scientist or clinical researcher. Upon the development of biotech products there is a need for a workforce involved in quality and safety control and in wide-scale manufacturing and production. In addition, with knowledge about the biotech industry, you can be effective in the marketing and sales of new products. Career opportunities available to individuals with a background in biotechnology range from research at the laboratory to administration.

With the approval of "Vision 2025," Tulsa Community College Southeast Campus witnessed the construction of a state-of-the-art biotechnology learning facility. In addition, the College implemented a biotech curriculum for the fulfillment of the Biotechnology Associate in Science and the Biotechnology Associate in Applied Science degrees. Upon the completion of these degrees, students will have learned more than 40 laboratory techniques widely used in the biotech industry.



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DNA EXTRACTION

Materials

- Strawberries (2)
- Funnel
- Ziploc Bag
- 50 mL test tube
- 10 mL graduated cylinder
- Ice cold 91% isopropyl alcohol
- DNA Extraction Buffer
(500 mL H₂O, 20 mL liquid detergent, 1/8 tsp salt)
- Wooden skewer

Procedure

1. Place 2 strawberries in a Ziploc bag. Using a graduated cylinder, measure 10 mL of DNA Extraction Buffer and add to your bag. Remove the air from the bag and seal it tightly. Mash the contents of the bag.
 - The DNA Extraction Buffer is used to break up the fruit cell membranes, giving us access to the DNA.
2. Using the funnel, pour your mashed contents into a 50 mL tube.
3. Being careful not to disturb the mixture in the test tube, carefully transfer 10 mL of alcohol down the side of your test tube. Do not mix.
 - Adding the alcohol will cause the DNA to clump together, making the DNA easier to see.
4. The alcohol will form a layer on top of your fruit mixture. In this top layer, a white and stringy substance should begin to form. This is DNA!
5. Try to spool your DNA onto a wooden skewer by carefully inserting the skewer into the top alcohol layer and gently rotating the skewer in one direction.

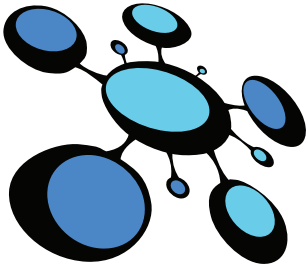
Works Cited

Harrell, Pamela Esprivalo, Debbie Richards, James Collins and Sarah Taylor. "Using Concrete and Representational Experiences to Understand the Structure of DNA: A Four-Step Instructional Framework." *The American Biology Teacher* 67.2 (2005): 77-85. ProQuest Nursing Journals. Proquest. Tulsa Community College. 29 January 2007 <<http://proquest.umi.com>>.

Visit the following link (from above cited source) for information about extracting DNA at home

www.coe.unt.edu/harrell/strawberryDNAextraction.htm





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FISH MUSCLE PROTEIN GEL ANALYSIS*

Look at the Fish Protein Electrophoresis picture provided. This is a picture of a polyacrylamide gel.

Seven organisms had their muscle tissue processed for this lab. We simply bought these fish at the market and processed them.

Notice also the two lanes marked "Kaleidoscope Standard." These multi-colored lanes are filled with proteins of known sizes. We have typed the size in kilodaltons at the right of the gel.

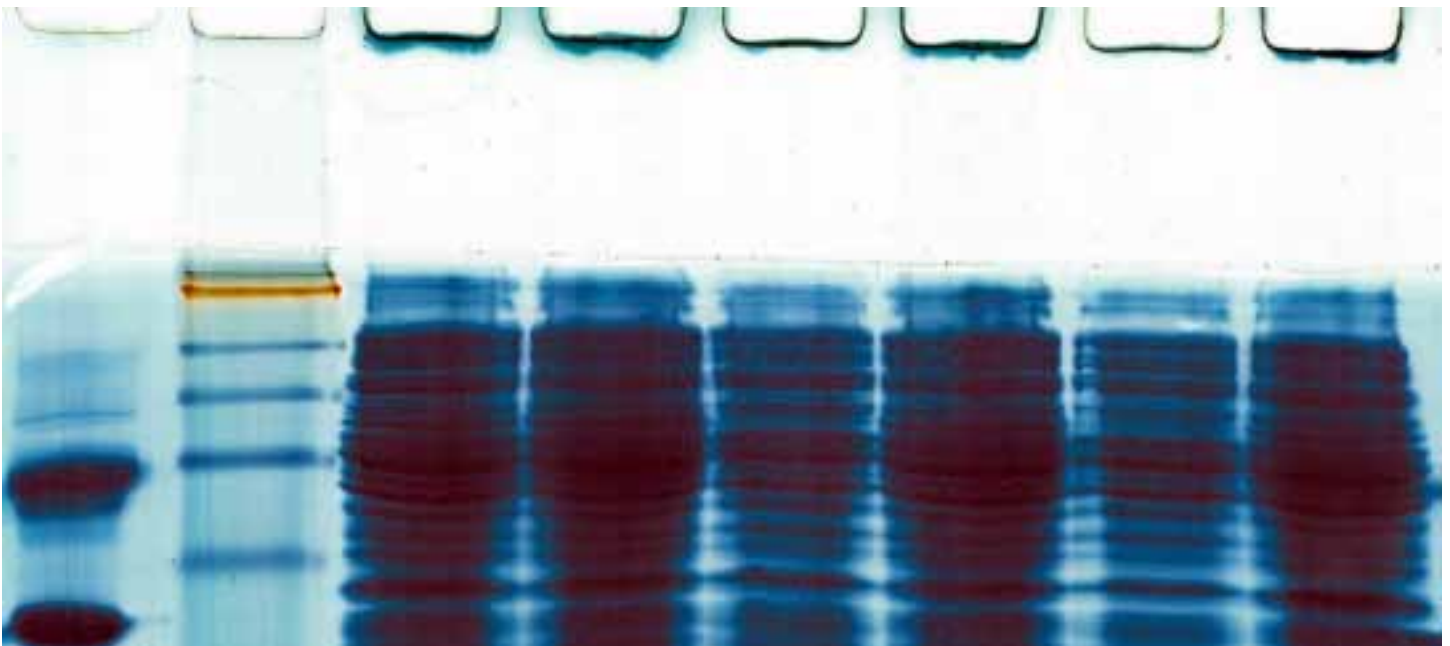
1. Using the Kaleidoscope Standard lane and the sizes in kDa, what is the approximate size (in kilodaltons) of the top blue band (myosin) in the "Actin and Myosin Standard" lane? What is the approximate size of the second distinct band (actin)?
2. Look at the protein bands from the Cod lane. What other two lanes seem to have similar protein bands? Look closely.
3. Look at the protein bands from the Shrimp lane. What other lane looks very similar in banding?
4. Now that you have studied the gel, look at the evolution tree. Are the similarities and differences in gel banding reflected in the evolutionary tree? (Look at the placement of the Shrimp, Crab, Cod, Salmon and Pollock on the evolutionary tree provided). Complete this statement:

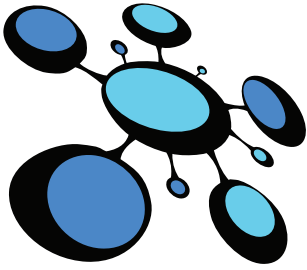
Based upon our protein gel study, it appears that the organisms found closer together on the tree have proteins which are more _____.

Extensions

5. Imagine a protein band that has migrated down to 100 kDa, and the fact that an average amino acid weighs ~110 daltons (not kilodaltons). How many amino acids make up the protein in the 100kDa band? Hint: First determine how many daltons in 100kDa.
6. Predict the number of DNA base pairs in the gene that encodes that particular protein band. (Remember that it takes 3 pairs of DNA bases to code for one amino acid.)

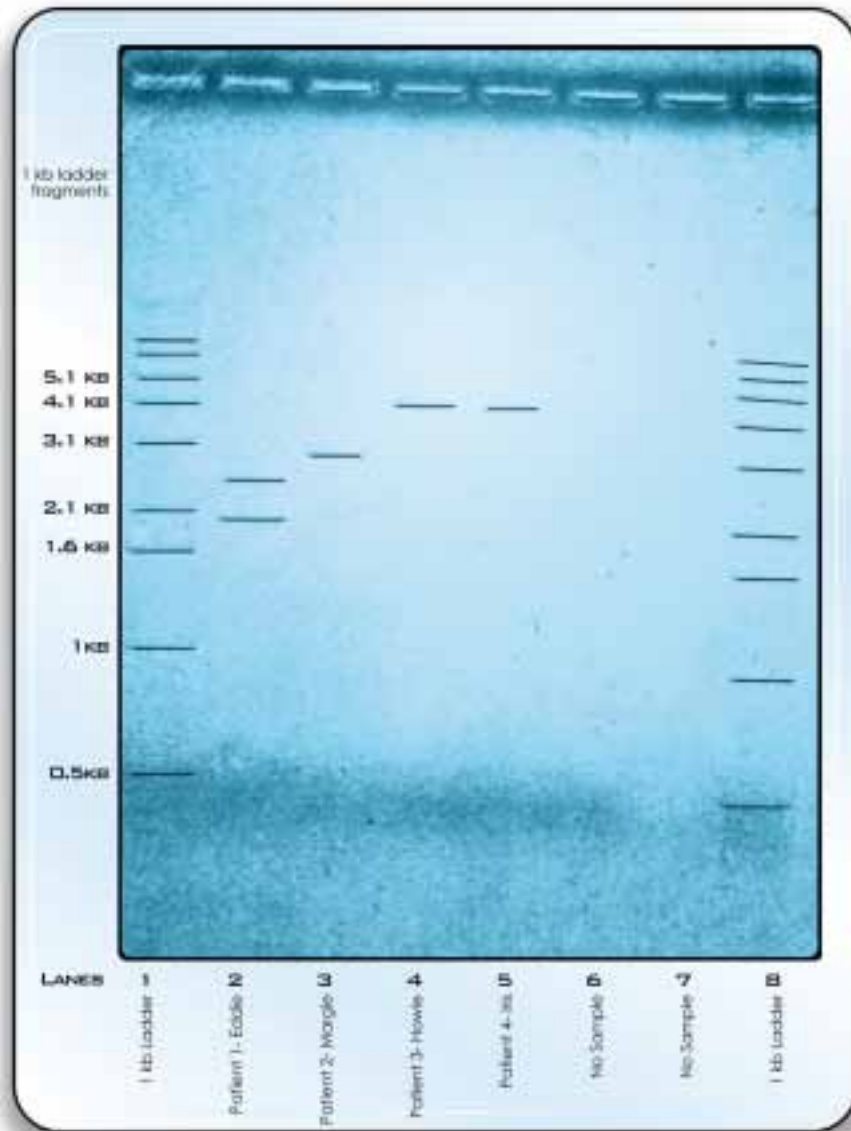
*Adapted from *Comparative Proteomics Kit I: Protein Profiler Module (Catalog #166-2700EDU)*, *Biotechnology Explorer instruction manual, Rv.B.* Copyright 2001 by Bio-Rad Laboratories, Life Science Education. 1-800-4-BIORAD (1-800-424-6723), www.explorer.bio-rad.com





Biotechnology

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IDENTIFICATION OF VIRAL DNA FRAGMENT ANALYSIS

Objective: Your laboratory is in charge of identifying patients that have been infected by a virus. Each patient submitted a blood sample for the analysis. The virus can be identified by the presence of a DNA fragment that is approximately 2.8 kb in size.

Procedure: Lanes 1 and 8 contain 1 kb ladder that is a size standard for identifying known sizes of DNA fragments. Using lane 1 as a reference for fragment size, analyze the patient samples in lanes 2-5. Your viral DNA is 2.8 kb in size.

Which patient is infected with the virus? _____

BIOTECHNOLOGY

ASSOCIATE IN SCIENCE

PROGRAM DESCRIPTION

This suggested curriculum includes TCC degree requirements and courses generally completed in the first two years of a four-year curriculum. Students will be educated in the fundamentals of biology, chemistry and biochemistry with heavy emphasis on a wide range of laboratory procedures. The topics of lab safety, protein isolation and separation techniques, cell culture, molecular biology and recombinant DNA, and quality control as they apply to both a manufacturing or research environment will be addressed. Students considering this major should consult the catalog of the college or university to which they are planning to transfer and carefully select courses that will meet requirements for both the baccalaureate and associate degree programs.

CURRICULUM

GENERAL EDUCATION REQUIREMENTS

CREDIT HOURS: 24

Science and recommended general elective requirements are satisfied in the Specialized Course Requirements section for this degree.

English 6 hours

*ENG 1113 Freshman Composition I

*ENG 1213 Freshman Composition II

Social Sciences 6 hours

POS 1113 American Federal Government

and select 3 credit hours from the following:

HIS 1483 US History 1492 to Civil War Era

HIS 1493 US History Civil War Era to Present

Humanities 6 hours

See General Education page in the catalog for complete list of available courses.

PHI 2153 Medical Ethics recommended.

Mathematics 3 hours

*MTH 1513 College Algebra

Required Electives 3 hours

Select one 3-hour course from one of the following: Psychology, Social Sciences, Foreign Language, or Fine Arts. (Art, Music, Theatre)

SPECIALIZED COURSE REQUIREMENTS

CREDIT HOURS: 43

Biology 4 hours

*BIO 2164 Microbiology

Biotechnology 24 hours

BTC 1113 Introduction to Biotechnology

*BTC 1315 Biotechnology Laboratory Methods & Techniques

*BTC 1534 Cell Culture Techniques

*BTC 2246 Molecular Biology

*BTC 2335 Proteomics & Instrumentation

*BTC 2101 Biotechnology Quality Assurance

Chemistry 15 hours

*CHE 1315 General Chemistry I

*CHE 1415 General Chemistry II

*CHE 2145 Organic Chemistry I

Additional Recommended Courses

ENG 2333 Technical Writing

*MTH 2193 Elementary Statistics

*CHE 2353 Introduction to Biochemistry

*CHE 2245 Organic Chemistry II

Total Credit Hours: 67

*Course has prerequisite (See course description section of catalog). Physical Education activity classes do not count toward the associate degree requirements in this curriculum at TCC. To receive an A.A. or A.S. degree, students must demonstrate computer proficiency.

For More Information Contact:

Science & Mathematics Division, Southeast Campus 918.595.7742

Counseling Centers: Metro 918.595.7151, Northeast 918.595.7451,

Southeast 918.595.7651, West 918.595.8176

Please contact the Science & Mathematics Division or see an advisor for recommended course sequence.



Tulsa Community College



BIOTECHNOLOGY

ASSOCIATE IN APPLIED SCIENCE

PROGRAM DESCRIPTION

This program is designed for students who wish to acquire the skills necessary to work in the field of biotechnology. Students will be educated in the fundamentals of biology, chemistry, and biochemistry with a heavy emphasis on a wide range of laboratory procedures. The topics of lab safety, protein isolation and separation techniques, cell culture, molecular biology and recombinant DNA will be included. The topics of technical writing, medical ethics and quality control as they apply to both manufacturing and research environments also will be addressed.

CURRICULUM

GENERAL EDUCATION REQUIREMENTS

CREDIT HOURS: 21

Science and recommended general elective requirements are satisfied in the Specialized Course Requirements section for this degree.

English 6 hours

ENG 1113 Freshman Composition I

*ENG 2333 Technical Writing

Social Sciences 6 hours

POS 1113 American Federal Government

and select 3 credit hours from the following:

HIS 1483 US History 1492 to Civil War Era

HIS 1493 US History Civil War Era to Present

Humanities 3 hours

PHI 2153 Medical

Mathematics 6 hours

*MTH 1513 College Algebra

*MTH 2193 Statistics

SPECIALIZED COURSE REQUIREMENTS

CREDIT HOURS: 42

Biology 8 hours

BIO 1224 Introduction to Biology for Majors

*BIO 2164 Microbiology

Biotechnology 26 hours

BTC 1113 Introduction to Biotechnology

*BTC 1315 Biotechnology Laboratory Methods & Techniques

*BTC 1534 Cell Culture Techniques

*BTC 2246 Molecular Biology and Techniques

*BTC 2335 Proteomics & Instrumentation

*BTC 2101 Biotechnology Quality Assurance

*BTC 2512 Biotechnology Apprenticeship

Chemistry 8 hours

CHE 1114 Principles of Chemistry

* **CHE 1224 Introductory Organic & Biochemistry

Total Credit Hours: 63

*Course has prerequisite (See course description section of catalog).

** Admissions to Biotechnology program or permission of instructor.

For More Information Contact:

Science & Mathematics Division, Southeast Campus 918.595.7742

Counseling Centers: Metro 918.595.7151, Northeast 918.595.7451,

Southeast 918.595.7651, West 918.595.8176

Please contact the Science & Mathematics Division or see an advisor for recommended course sequence.



Tulsa Community College



BIOTECHNOLOGY

CERTIFICATE OF ACHIEVEMENT**

PROGRAM DESCRIPTION

This program is for students who desire to acquire or upgrade their skills in the area of biotechnology. It is assumed that students will have the required background in the biological sciences and chemistry prior to entering this program. Students will be trained in the practices and procedures so that they will be prepared to extrapolate present knowledge to solve problems faced in the future. There will be a heavy emphasis on a wide range of laboratory procedures. The topics of lab safety, protein isolation and separation techniques, cell culture, molecular biology and recombinant DNA, and quality control as they apply to both a manufacturing or research environments will be addressed.

CURRICULUM

CERTIFICATE REQUIREMENTS

CREDIT HOURS: 21

Biotechnology 26 hours

- BTC 1113 Introduction to Biotechnology
- *BTC 1315 Biotechnology Laboratory Methods & Techniques
- *BTC 1534 Cell Culture Techniques
- *BTC 2246 Molecular Biology & Techniques
- *BTC 2335 Proteomics & Instrumentation
- *BTC 2101 Biotechnology Quality Assurance
- *BTC 2512 Biotechnology Apprenticeship

Total Credit Hours: 26

*Course has prerequisite (See course description section of catalog).

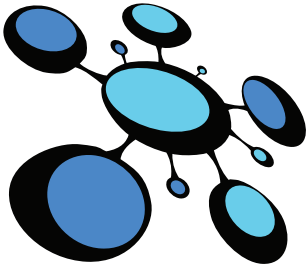
**Pending approval of the Oklahoma State Regents for Higher Education.

For More Information Contact:

Science & Mathematics Division, Southeast Campus 918.595.7742
Counseling Centers: Metro 918.595.7151, Northeast 918.595.7451,
Southeast 918.595.7651, West 918.595.8176
Please contact the Science & Mathematics Division or see an advisor for
recommended course sequence.



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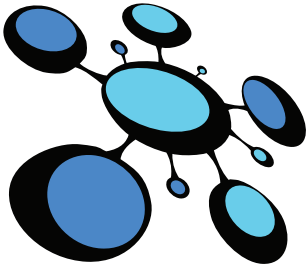


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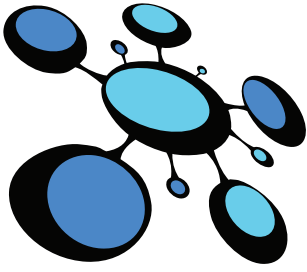


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Biotechnology

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NOTES



TC Tulsa Community College

Biotechnology

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BIOTECHNOLOGY PROGRAMS AT TULSA COMMUNITY COLLEGE

For information about the Biotechnology Program contact:

Dr. Diana Spencer

Biotechnology Assistant Professor/Coordinator
Tulsa Community College
10300 E. 81st Street S.
Tulsa, Oklahoma 74133
918-595-8605
dspencer@tulsacc.edu

Or

Donna Kline, M.Ed. or Donita Gray, B.S.

MEDBEd Specialists
Tulsa Community College
10300 E. 81st Street S.
Tulsa, Oklahoma 74133
918-595-4611
dkline@tulsacc.edu or dgray@tulsacc.edu

For course sequence information, please contact:

Counseling Centers
Metro Campus 918-595-7151
Northeast Campus 918-595-7451
Southeast Campus 918-595-7651
West Campus 918-595-8176

Easy access to TCC Biotechnology and NIH MEDBEd Program:

TCCBiotech.org

For Information about the Tulsa Community College Biotechnology Program, including degree information, course requirements and descriptions, and faculty information please visit:

<http://www.tulsacc.edu/biotech>

Catalog (Programs Section, Biotechnology):

Associate of Science
Associate of Applied Science
Biotechnology Certificate

Your Biotechnology Learning Extravaganza Team:

Diana Spencer, Ph.D. | Dusti Sloan, M.S. | Mary Phillips, M.S.
Bill Briscoe, Ph.D. | Donita Gray, B.S. | Donna Kline, M.Ed.
Paulette Ramsey, M.Ed. | Matt Jostes, B.A.