

SYNTHETIC PROGRAM

1. Identification data:	
Name of the institution:	Universidad Autónoma de Nuevo León
Name of the unit:	School of Medicine
Name of the educational program:	Clinical Chemistry
Name of the learning unit:	Molecular pathology
Classroom hours-theory and/or practice, total:	60
Classroom frequencies per week :	3 horas
Hours outside the classroom, total:	30
Type of modality:	Face-to-Face instruction
Type of academic period:	Sixth, seventh, eighth and ninth semesters
Type of learning unit:	Optional
Curricular area:	ACFP-F
UANL Credits:	3
Date of production:	August 6 th , 2018
Date of last update:	August 3 rd , 2020
Design and Upgrade Officer(s)	Dr. Miguel Ángel Déctor Carrillo

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2. Purpose(s):

This Learning Unit (LU) aims to contribute to the graduate profile of the Clinical Chemistry to carry out the implementation, development, validation, and evaluation of molecular diagnostic tests for the generation of knowledge in their professional field.

In this LU, logical, critical, and proactive thinking is encouraged through the analysis of natural phenomena such as the appearance of germline mutations that lead to a hereditary disease or somatic mutations that lead to an acquired disease such as cancer. Through the request for evidence consisting of research and presentation of topics together with the resolution of cases and problems, the development of skills to implement molecular diagnostic tests for the future exercise of their academic work and that of their profession is promoted. Therefore, the fundamentals of traditional and cutting-edge methods and techniques of molecular pathology applied to respond to needs in health areas with the human, academic and professional commitment to contribute to consolidating the general well-being of the patient are critically analyzed.

Based on specific competencies, this LU contributes to the student being able to choose and implement the most appropriate molecular methodology, to interpret and make timely decisions that allow them to resolve conflicts generated when issuing a diagnostic result or a therapeutic prognosis.

For the development of this LU located in the seventh semester of the degree, competencies are reinforced, and basic knowledge acquired at the LU of Molecular Biology are used, such as the molecular bases of the macromolecules of life, as well as those related to the properties, structures and functions of cells reviewed in the Biochemistry and Cell Biology learning units. and those related to the transmission and alteration of genetic information from the LU of Genetics. The LU of Molecular Pathology contributes to the competencies of the LU elective Molecular Diagnosis and Biotechnology and to the subsequent LU Clinical Pathology for the selection, implementation, and interpretation of laboratory tests for the diagnosis of diseases caused by various molecular alterations. This LU also contributes to consolidating the preparation of the Clinical Chemist Biologist for the application of the scientific method in the generation of knowledge.

3. Competences of the graduate profile:

General competences to which this learning unit contributes:

- *Instrumental skills:*

5. To use logical, critical, creative, and proactive thinking to analyze natural and social phenomena that allow them to make relevant decisions in their sphere of influence with social responsibility.
8. To use traditional and cutting-edge research methods and techniques for the development of their academic work, the exercise of their profession and the generation of knowledge.

- *Personal and social interaction skills:*

10. To intervene in the face of the challenges of contemporary society at the local and global level with a critical attitude and human, academic and professional commitment to contribute to consolidating general well-being and sustainable development.

- *Integrative skills:*

14. To resolve personal and social conflicts, in accordance with specific techniques in the academic field and in their profession for appropriate decision-making.

Specific competences of the graduate profile to which the learning unit contributes:

5. To incorporate new analytical methodology that contributes to the functional, economic and/or environmental improvement of laboratory processes to respond to needs in health areas.
6. To interpret the results of analyses based on established criteria that allow timely and pertinent decision-making in clinical, toxicological, chemical, food, forensic, and environmental diagnosis.

4. Factors to consider for evaluating the learning unit

- Oral and written presentation of topics assigned by the professor
- Daily evidence
- Report for assigned disease
- Course integrative project/product

5. Course integrative project/product:

Resolution of a problem assigned by the professor, in which the student theoretically proposes a molecular method useful for diagnosing a mutation associated with a genetic disease. The student will give the corresponding oral presentation and submit a printed report of a fictitious but plausible result

6. Sources of support and consultation:

- Luque--Cabrero, J., & Herráez-Sánchez, A. (2001). *Texto Ilustrado de Biología Molecular e Ingeniería Genética*. España: editorial Elsevier (Ediciones Harcourt, S.A.).
- Strachan T. y Read A. (2006) *Genética Humana*. España: editorial McGrawHill.
- Turnpenny S. (2009). *Elementos de Genética Médica*. España: editorial Elsevier.
- Herráez-Sánchez, A. (2012). *Texto ilustrado e interactivo de Biología Molecular e Ingeniería Genética conceptos, Técnicas y Aplicaciones en Ciencias de la Salud*. España: editorial Elsevier.

Suggested websites:

ThermoFisher Scientific. Real-Time PCR (qPCR) Learning Center. Retrieved August 3, 2020 from ThermoFisher website:
<https://www.thermoFisher.com/mx/es/home/life-science/pcr/real-time-pcr/real-time-pcr-learning-center.html>

Integrated DNA technology. Webinars & video tutorials. Retrieved August 3, 2020, from IDT Website:
<https://www.idtdna.com/pages/education/videos>

YouTube Video. Ensembl training, Retrieved August 3, 2020. <http://www.ensembl.org/Multi/Help/Movie?db=core;id=188>

Wellcome Sanger Institute. COSMIC tutorials videos. Retrieved August 3, 2020, from COSMIC website:
<https://cancer.sanger.ac.uk/cosmic/help/tutorials>

Entidad Mexicana de Acreditación A.C. Accreditation process. Retrieved August 3, 2020, from EMA website:
https://www.ema.org.mx/portal_v3/index.php/proceso-de-acreditacion/proceso-deacreditacion

YouTube Video. Tutorials: Genetic Testing Registry (GTR), Retrieved August 3, 2020.
<https://www.youtube.com/playlist?list=PL1C4A2AFF811F6F0B>

Coriell Institute. Browse: Diseases. Retrieved August 3, 2020 from Coriell website:
<https://www.coriell.org/0/Sections/BrowseCatalog/Diseases.aspx?PgId=3>

Monaghan, K. G., Lyon, E., Spector, E. B., & American College of Medical Genetics and Genomics (2013). ACMG Standards and Guidelines for fragile X testing: a revision to the disease-specific supplements to the Standards and Guidelines for Clinical Genetics Laboratories of the American College of Medical Genetics and Genomics. *Genetics in medicine: official journal of the American College of Medical Genetics*, 15(7), 575–586. <https://doi.org/10.1038/gim.2013.61>

The National Center for the Biotechnology Information. GeneReviews. Recuperado 3 de Agosto de 2020 de NCBI website:
<http://www.ncbi.nlm.nih.gov/books/NBK1116/>

