

<b>1. Module identification code.</b>	
Name of the institution:	Universidad Autónoma de Nuevo León
Name of the school:	School of Medicine
Name of the degree program:	Clinical Chemistry
Name of the course (learning unit):	Pathology
Total number of class hours-theory and practice:	48
Class hours per week:	2
Independent study:	12
Course modality:	Face-to-face instruction
Module level:	Fourth semester
Core/elective module:	Core
Curriculum area:	ACFB
UANL credit points:	2
Create date:	January 30 <sup>th</sup> , 2018
Date of last amendment made:	June 10 <sup>th</sup> , 2024
Person(s) responsible for the design and amendment of the module:	MD. María de Lourdes Chávez Briones, MD. Adriana Gpe. Ancer Arellano, MD. Ivette C. Miranda Maldonado. PhD. Marta Graciela Ortega Martínez, PhD. Gilberto Jaramillo Rangel, PhD. Iván Marino Martínez

## 2. Presentation:

The Pathology learning unit is located in the fourth semester of the Clinical Chemistry degree and is planned to contribute to the Clinical Chemistry graduation profile, directing you in understanding the biological processes that lead to the appearance of diseases and how they are. They relate to cellular and subcellular changes that provide information for diagnosis through laboratory procedures.

It is divided into four stages. During the first stage, cellular lesions are classified into reversible and irreversible according to the type of etiological agent to relate the morphological changes to the clinical data. In stage 2, the student identifies the variants of the inflammatory response and cellular repair according to the microscopic morphology to relate them with clinical laboratory information. In the third stage, the pathophysiology of immunological diseases is analyzed to relate the morphological changes with the clinical data and the diagnostic methods of the immunology laboratory. Finally, in stage 4, the morpho-molecular characteristics of neoplastic diseases are analyzed to relate them to tumor markers useful in the clinical laboratory.

As evidence of the learning acquired, students present synoptic tables or reports on the resolution of clinical cases of the topics reviewed. The integrative learning product consists of a rehearsal of a pathological process, where the student demonstrates the application of the knowledge acquired in this learning unit.

## 3. Purpose:

This Learning Unit (LU) promotes the training of professionals who contribute with an ethical attitude in the diagnosis of diseases, with a program designed for the development of skills to identify and classify various pathological entities, as well as to recognize molecular changes, structural and physiological that accompany them at the cellular, tissue, or organic level; so that you can relate them to the alterations observed in clinical laboratory tests.

During the development of the LU, he manages communication technologies for the search for information and the analysis of the conditions in which different pathologies appear, applies learning strategies for the management of cutting-edge information and can point out and describe with the own vocabulary the morphological characteristics of each one; It also achieves the adaptability required by the different learning experiences in the classroom during the development of the LU.

In relation to specific competencies, it allows you to interpret the results of clinical laboratory analyzes by relating them to changes in tissue structure and contrasting them with normal parameters.

Within the learning units of the curriculum, it is related to Cellular Biology and Morphological Sciences, from which it takes the bases of normality of biological structures and identifies the level of organization where the disease occurs; with Microbiology through the analysis of infectious etiological agents and relates them to the morphological alterations observed at the cellular and tissue level and with Medical Physiology, where the normal physiological bases are obtained to understand the pathophysiology of the disease; It provides the AUs of Genetics and Clinical Biochemistry with the physio-morphological bases of diseases.

#### 4. Competences of the graduate profile

##### **General competences to which this module (learning unit) contributes:**

###### *Instrumental skills:*

- 1.-To apply autonomous learning strategies at different levels and fields of knowledge that allow them to make timely and relevant decisions in the personal, academic and professional spheres.
- 3.- To manage Digital Information, Communication, Knowledge and Learning Technologies (TICCAD), in academic, personal and professional environments with cutting-edge techniques that allow their constructive and collaborative participation in society
- 4.- To master their mother tongue orally and in writing with correctness, relevance, timeliness and ethics, adapting their message to the situation or context, for the transmission of ideas and scientific findings.

###### *Personal and social interaction skills:*

- 11.-To practice the values promoted by the UANL: truth, equity, honesty, freedom, solidarity, respect for life and others, peace, respect for nature, integrity, ethical behavior and justice, in their personal and professional environment to contribute to building a sustainable society

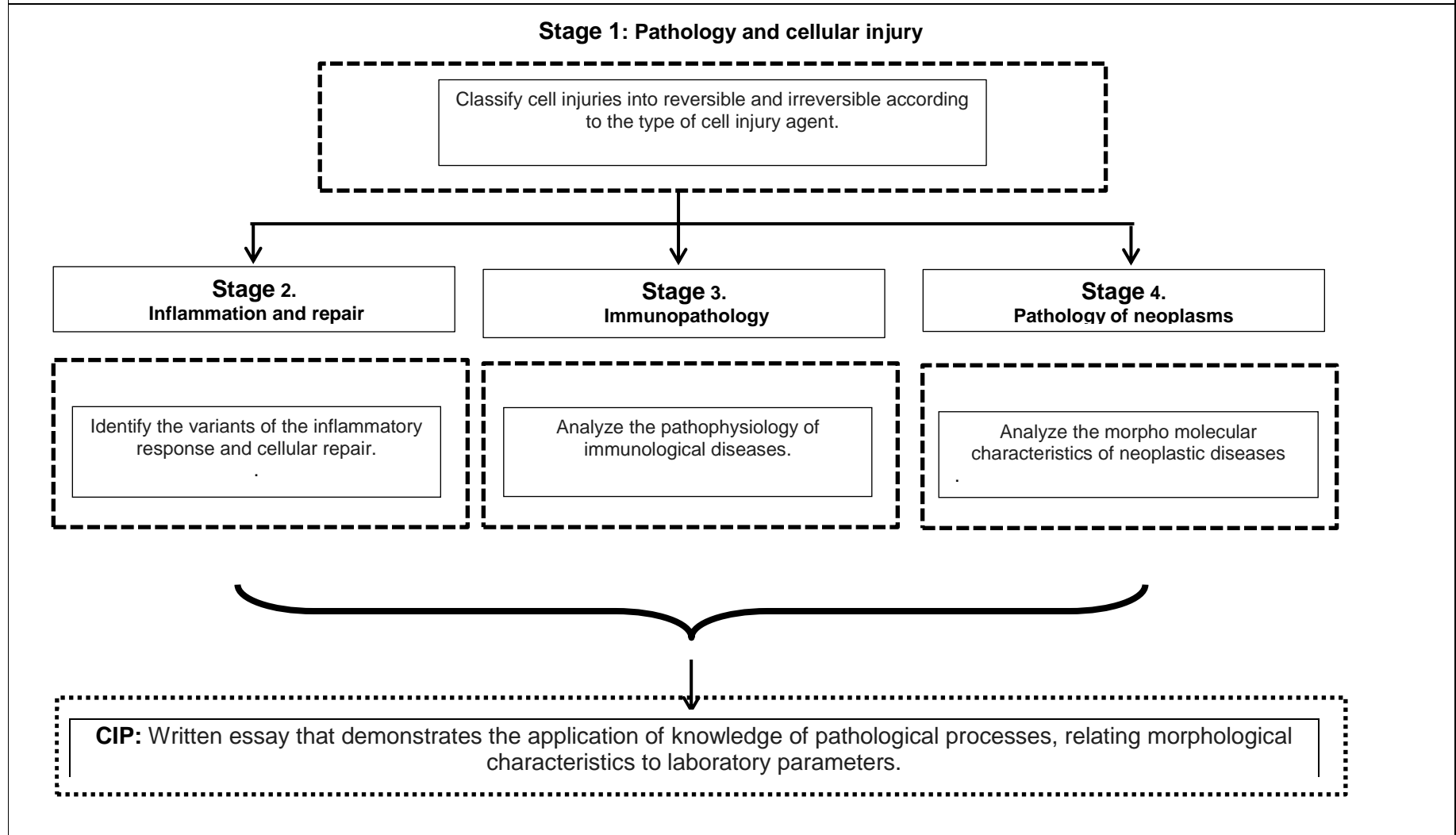
###### *Integrative skills:*

- 15.- To achieve the adaptability required by the uncertain social and professional environments of our time to create better living conditions.

##### **Specific competences of the graduate profile to which this module (learning unit) contributes:**

- 3.-To handle chemical and biological materials following official Mexican and/or international standards that guarantee their correct use and disposal to preserve health and the environment.
- 4.- To validate bioanalytical methods under established performance criteria that allow reliability of the results obtained in chemical-biological samples
- 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.

## 5. Course roadmap:



## 6. Structuring into stages or phases:

### Stage 1: Pathology and cellular injury.

**Component(s) of the competence:** classifies reversible and irreversible cellular lesions according to the type of etiological agent to relate morphological changes to clinical data.

Evidence of student learning	Performance criteria	Learning activities	Content	Resources
<p>Evidence 1: Report on resolution of cases of cellular injury (5)</p> <ul style="list-style-type: none"> <li>- Cellular adaptation</li> <li>- Cell accumulations</li> <li>- Pigments and calcifications</li> <li>- Reversible cell injury</li> <li>- Irreversible cellular injury</li> </ul>	<ul style="list-style-type: none"> <li>*They participate as a group in the review of the topic to be discussed for the resolution of cases.</li> <li>*Do it individually</li> <li>*Review and analyze the contents corresponding to the stage in your textbook.</li> <li>*Analyzes the teaching and support material available on the Moodle platform.</li> <li>* Correlates the clinical data with the morphological findings of the cellular pathology processes seen in the course contents.</li> <li>*Answer reviewed cases by hand.</li> <li>* Send individually written cases resolved within the indicated time.</li> </ul>	<ul style="list-style-type: none"> <li>*The student individually and prior to the teacher's presentation, reviews and analyzes the contents corresponding to the stage in their textbook.</li> <li>*The teacher presents the topic with the support of an electronic presentation with graphic material.</li> <li>The student actively participates in a group discussion guided by the teacher.</li> <li>*At the end of the stage the student makes synoptic tables of the topics covered in the stage. (Evidence 1)</li> </ul>	<p><b>Conceptual content:</b> <b>Introduction to Pathology:</b></p> <ul style="list-style-type: none"> <li>• Definition of pathology</li> <li>• Branches of pathology</li> </ul> <p><b>Pathology and cellular injury:</b></p> <ul style="list-style-type: none"> <li>• Cell injury agents</li> <li>• Accumulations, pigments, calcifications and types of adaptation</li> <li>• Reversible and irreversible cell injury</li> </ul> <p><b>Procedural Content:</b> Recognize the clinical data and morphological changes of the pathological process reviewed.</p>	<p>Electronic presentations and graphic material.</p> <p><b>Textbooks:</b> Kumar. Vinay y cols. (2021) Patología esencial, 1ª Ed, España, Editorial Elsevier Valencia M., y cols (2015). <i>Patología</i>, Barcelona, España, Editorial: Mc Grow Hill Interamericana.</p> <p><b>Electronic pages:</b>  <a href="https://youtu.be/BgZuJteYxQk?si=GP_9_6nEG57NNZKA">https://youtu.be/BgZuJteYxQk?si=GP_9_6nEG57NNZKA</a>  <a href="https://youtu.be/cOwxvQJvXUA?si=vcZbRMScwu_uQhn5">https://youtu.be/cOwxvQJvXUA?si=vcZbRMScwu_uQhn5</a>  <a href="https://youtu.be/8TyPsWtdmgc?si=7dzYUpUMg6BH2s3n">https://youtu.be/8TyPsWtdmgc?si=7dzYUpUMg6BH2s3n</a> </p>

## Stage 2: Inflammation and repair

**Component(s) of the competence:** Identify the variants of the inflammatory response and cellular repair, according to the microscopic morphology, to relate them to the clinical data.

Evidence of student learning	Performance criteria	Learning activities	Content	Resources
Evidence No. 2: Report on resolution of cases of inflammatory response and cellular repair (5 cases)	<p>*They participate as a group in the review of the topic to be discussed for the resolution of cases.</p> <p>*Do it individually</p> <p>*Review and analyze the contents corresponding to the stage in your textbook.</p> <p>*Analyzes the teaching and support material available on the Moodle platform.</p> <p>* Correlates the clinical data with the morphological findings of the cellular pathology processes seen in the course contents.</p> <p>*Answer reviewed cases by hand.</p> <p>* Send individually written cases resolved within the indicated time.</p>	<p>*The student individually and prior to the teacher's presentation, reviews and analyzes the contents corresponding to the stage in their textbook.</p> <p>*The teacher presents the topic with the support of an electronic presentation with graphic material.</p> <p>The student actively participates in a group discussion guided by the teacher.</p> <p>*At the end of the stage the student makes synoptic tables of the topics covered in the stage. (Evidence 2)</p> <p><b>Accredited activity No. 1:</b> Written evaluation about the content stage 1 and 2</p>	<p>Conceptual content:</p> <p><b>Acute inflammation:</b></p> <ul style="list-style-type: none"> <li>Vascular changes, mediators and cellular elements</li> <li>Clinical manifestations, morphological changes and evolution</li> </ul> <p><b>Chronic inflammation:</b></p> <ul style="list-style-type: none"> <li>Mediators, cellular elements, histological variants, clinical manifestations and evolution</li> </ul> <p><b>Tissue repair and wound repair:</b></p> <ul style="list-style-type: none"> <li>Morphological changes, clinical manifestations and repair abnormalities</li> </ul>	<p>Electronic presentations and graphic material.</p> <p><b>Textbooks:</b> Kumar. Vinay y cols. (2021) <i>Patología esencial</i>, 1ª Ed, España, Editorial Elsevier Valencia M., y cols (2015). <i>Patología</i>, Barcelona, España, Editorial: Mc Grow Hill Interamericana.</p> <p><b>Electronic pages:</b>  <a href="https://youtu.be/BmUXDye2a5A?si=A6-uBXQK8jsNbsrU">https://youtu.be/BmUXDye2a5A?si=A6-uBXQK8jsNbsrU</a>  <a href="https://youtu.be/LrNd2elpPBw?si=4aWbJinfjROnUEws">https://youtu.be/LrNd2elpPBw?si=4aWbJinfjROnUEws</a>  <a href="https://youtu.be/6yfh0kWQo4M?si=49mRTyDUVp7x18N2">https://youtu.be/6yfh0kWQo4M?si=49mRTyDUVp7x18N2</a>  <a href="https://youtu.be/TJIW0QLRJfY?si=l2MnlaaxseleEHst">https://youtu.be/TJIW0QLRJfY?si=l2MnlaaxseleEHst</a>  <a href="https://youtu.be/eR047nriTjA?si=1rCI-YjM0tway2fO">https://youtu.be/eR047nriTjA?si=1rCI-YjM0tway2fO</a> </p>

### Stage 3. Immunopathology

**Component(s) of the competence:** Analyzes the pathophysiology of immunological diseases in hypersensitivity and autoimmune diseases, to relate morphological changes with clinical data and clinical laboratory diagnostic methods.

Evidence of student learning	Performance criteria	Learning activities	Content	Resources
<p>Evidence No. 3: Report on resolution of cases of immunological diseases (5)</p> <ul style="list-style-type: none"> <li>- Type hypersensitivity</li> <li>- Type I hypersensitivity</li> <li>- Type II hypersensitivity</li> <li>- Type I hypersensitivity</li> <li>- Autoimmune diseases</li> </ul>	<p>*They participate as a group in the review of the topic to be discussed for the resolution of cases.</p> <p>*Do it individually</p> <p>*Review and analyze the contents corresponding to the stage in your textbook.</p> <p>*Analyzes the teaching and support material available on the Moodle platform.</p> <p>* Correlates the clinical data with the morphological findings of the cellular pathology processes seen in the course contents.</p> <p>*Answer reviewed cases by hand.</p> <p>* Send individually written cases resolved within the indicated time.</p>	<p>*The student individually and prior to the teacher's presentation, reviews and analyzes the contents corresponding to the stage in their textbook.</p> <p>*The teacher presents the topic with the support of an electronic presentation with graphic material.</p> <p>The student actively participates in a group discussion guided by the teacher.</p> <p>*At the end of the stage the student makes synoptic tables of the topics covered in the stage. (Evidence 3)</p>	<p>Conceptual content: <b>Generalities of the immune response</b> Humoral and cellular immunity</p> <p><b>Classification and mechanisms of hypersensitivity</b> Type I hypersensitivity Type II hypersensitivity Type III hypersensitivity Type IV hypersensitivity</p> <p><b>Sick autoimmune:</b> Systemic Lupus Erythematosis Hashimoto thyroiditis Grave's disease Autoimmune hemolytic anemia</p>	<p>Electronic presentations and graphic material.</p> <p><b>Textbooks:</b> Kumar. Vinay y cols. (2021) Patología esencial, 1ª Ed, España, Editorial Elsevier Valencia M., y cols (2015). <i>Patología</i>, Barcelona, España, Editorial: Mc Grow Hill Interamericana.</p> <p><b>Electronic pages:</b> <a href="https://youtu.be/WY2-pBH9alk?si=132XVt_n4xHeMUvq">https://youtu.be/WY2-pBH9alk?si=132XVt_n4xHeMUvq</a> <a href="https://youtu.be/HRltDgwrK88?si=IYtqDbJoBn5M73md">https://youtu.be/HRltDgwrK88?si=IYtqDbJoBn5M73md</a> <a href="https://youtu.be/mTgD8mX12E0?si=p9BNSa4qYW iKfaYI">https://youtu.be/mTgD8mX12E0?si=p9BNSa4qYW iKfaYI</a></p>



#### Stage 4. Pathology of neoplasms

##### Component(s) of the competence:

Analyze the morpho-molecular characteristics of neoplastic diseases, according to the type of benign or malignant neoplasm, to relate them to useful tumor markers in the laboratory.

Evidence of student learning	Performance criteria	Learning activities	Content	Resources
<p>Evidence No. 4</p> <p>Report on resolution of cases of neoplastic diseases (5 cases)</p> <ul style="list-style-type: none"> <li>- Origin and nomenclature of neoplasia</li> <li>- Benign neoplasms</li> <li>- Malignant neoplasms</li> <li>- Tumor markers</li> </ul>	<ul style="list-style-type: none"> <li>*They participate as a group in the review of the topic to be discussed for the resolution of cases.</li> <li>*Do it individually</li> <li>*Review and analyze the contents corresponding to the stage in your textbook.</li> <li>*Analyzes the teaching and support material available on the Moodle platform.</li> <li>* Correlates the clinical data with the morphological findings of the cellular pathology processes seen in the course contents.</li> <li>*Answer reviewed cases by hand.</li> <li>* Send individually written cases resolved within the indicated time.</li> </ul>	<ul style="list-style-type: none"> <li>*The student individually and prior to the teacher's presentation, reviews and analyzes the contents corresponding to the stage in their textbook.</li> <li>*The teacher presents the topic with the support of an electronic presentation with graphic material.</li> <li>The student actively participates in a group discussion guided by the teacher.</li> <li>*At the end of the stage the student makes synoptic tables of the topics covered in the stage. (Evidence 4)</li> </ul> <p><b>Accredited activity No. 2</b> Written evaluation about the content stage 3 and 4</p> <p><b>Accredited activity No. 3</b> Written evaluation about the content stage 1 to 4</p>	<p>Conceptual content:</p> <p><b>Generalities of neoplasms</b></p> <p>Origin of neoplasms</p> <p>Basics</p> <ul style="list-style-type: none"> <li>-Neoplasia</li> <li>-Anaplasia</li> <li>-Differentiation</li> </ul> <p><b>Bases of the nomenclature of the neoplasms</b></p> <p><b>Evolution and clinical behavior of neoplasms</b></p> <p><b>Neoplasms:</b></p> <ul style="list-style-type: none"> <li>-Benign neoplasia</li> <li>-Malignant neoplasia</li> </ul> <p><b>Diagnostic methods:</b></p> <ul style="list-style-type: none"> <li>-Tumor markers</li> </ul>	<p>Electronic presentations and graphic material.</p> <p><b>Textbooks:</b></p> <p>Kumar. Vinay y cols. (2021) <i>Patología esencial</i>, 1ª Ed, España, Editorial Elsevier</p> <p>Valencia M., y cols (2015). <i>Patología</i>, Barcelona, España, Editorial: Mc Grow Hill Interamericana.</p> <p><b>Electronic pages:</b></p> <p>Páginas electrónicas:</p> <p><a href="https://youtu.be/qISaC3ay8LU?si=YJRnfsZShm-0hNRw">https://youtu.be/qISaC3ay8LU?si=YJRnfsZShm-0hNRw</a></p> <p><a href="https://youtu.be/GNlrydM38cg?si=OF4ljbGzhILj1r3o">https://youtu.be/GNlrydM38cg?si=OF4ljbGzhILj1r3o</a></p> <p><a href="https://youtu.be/74vGtHSfCT0?si=g1nmADLIITICVPJq">https://youtu.be/74vGtHSfCT0?si=g1nmADLIITICVPJq</a></p>



## 7. Summative evaluation:

Stage	Evidence	Weighing (%)
Stage 1	<b>Evidence 1:</b> Report on resolution of cases of cell injury (5)	5
Stage 2	<b>Evidence 2:</b> Report on resolution of cases of inflammatory response and cellular repair (5)	5
	<b>Accredited activity No. 1:</b> Written evaluation about content stage 1 y 2	20
Stage 3	<b>Evidence 3:</b> Report on resolution of cases of immunological diseases (5)	5
Stage 4	<b>Evidence 4:</b> Report on resolution of cases of neoplastic diseases (5)	5
	<b>Accredited activity No. 2</b> Written evaluation about content stage 3 y 4	20
	<b>Accredited activity No. 3</b> Written evaluation about content stage 1-4	30
<b>CIP</b>	<b>Course integrative project/product</b>	10
	<b>Total:</b>	<b>100</b>

## 8. Course integrative project/product:

Written essay on a pathological process assigned

## 9. References:

- Kumar. Vinay y cols. (2021) Patología esencial, 1ª Ed, España, Editorial Elsevier
- Valencia M., y cols (2015). *Patología*, Barcelona, España, Editorial: Mc Grow Hill Interamericana.
- College of American Pathologist (2018). PathologyOutlines.com. <https://www.pathologyoutlines.com/>
- The Pathology Guy. Recuperado el 10 de enero de 2024 [www.pathguy.com](http://www.pathguy.com)
- <https://www.uanl.mx/enlinea/>
- <http://www.medicina.uanl.mx/plataforma/login/index.php>