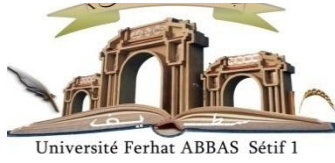


الجمهورية الجزائرية الديمقراطية الشعبية  
وزارة التعليم العالي و البحث العلمي

University Setif 1, Ferhat ABBAS  
Faculty of Natural sciences and  
life



جامعة ، سطيف1، فرحات عباس  
كلية علوم الطبيعة و الحياة

N° \_\_\_\_\_ /SNV/2025

DEPARTEMENT OF BIOTECHNOLOGY

## DESSERTATION

Presented by

**DOUAG Salah**

**GUETTAR Rihane**

**MANSAR Amira**

To obtain the diploma of

**MASTER**

**Field:** Biotechnology

**Speciality :** Biotechnology and molecular pathology

**Topic**

**ADJUVANT USED IN CANCER DIAGNOSIS**

**defended publically in: 02 / 07 / 2025**

**JURY:**

President: **MEZITI Hichem** UFAS1

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**2024/2025**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# **ACKNOWLEDGMENTS**

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**May all those who, directly or indirectly, contributed to the development of this modest work find here the expression of our gratitude and respect.**

# **DEDICATION**

**It is with great pleasure that I dedicate this modest work**

**To the most cherished person in my life, my mother.**

**To the one who made me a man, my father.**

**To my dear brothers.**

**To my colleagues Rayhan and Amira for their excellent work, seriousness,  
and patience.**

**To all my friends from the second-year Master's program in Biotechnology  
and Health.**

**To everyone who holds a place in my heart.**

**To all the members of my family and everyone who bears the name Douag,  
I dedicate this work to all those who have contributed to my success.**

**Mr. Douag Salah**

# DEDICATION

**It is with deep gratitude and heartfelt joy that I dedicate this modest work**

**To the most precious person in my life my dear mother whose unconditional love and endless support have been my greatest strength.**

**To my beloved father, who has always believed in me and encouraged me to strive for excellence.**

**To my dear family, whose support has never wavered.**

**To my wonderful friends who stood by me throughout this journey your kindness, laughter, and motivation meant everything to me.**

**To my dearest friends and sisters at heart, who have shared with me the hardships and joys of this path thank you for being there.**

**To my colleagues in the second-year Master's program in Biotechnology and Health, thank you for your collaboration and camaraderie.**

**To all those who have played a role, big or small, in my academic and personal journey I owe you a part of this success.**

**Finally, to everyone in my family and all those who carry the name Manser,**

**I dedicate this achievement to you with all my love and appreciation.**

**Manser Amira**

## **DEDICATION**

**It is with deep gratitude and heartfelt joy that I dedicate this modest work**

**To the most precious person in my life my dear mother whose unconditional love and endless support have been my greatest strength.**

**To my beloved father, who has always believed in me and encouraged me to strive for excellence.**

**To my dear family, whose support has never wavered.**

**To my wonderful friends who stood by me throughout this journey your kindness, laughter, and motivation meant everything to me.**

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**To all those who have played a role, big or small, in my academic and personal journey I owe you a part of this success.**

**Finally, to everyone in my family and all those who carry the name Guettar ,**

**I dedicate this achievement to you with all my love and appreciation.**

**Guettar Rihane .**

## *Summary*

A section is dedicated This thesis explores in depth the methods of cancer diagnosis, emphasizing the crucial role of modern adjuncts. It begins with an overview of the foundations of cancer biology, including its definition, the differences between normal and cancerous cells, the distinctive characteristics of tumor cells, the classification of cancers, their causes, and their development. to various diagnostic methods, ranging from physical examinations to advanced imaging techniques such as microscopy, ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), as well as diagnostic tests and procedures for tumor biomarker testing. The document then focuses on molecular biomarkers, including DNA methylation, non-coding microRNAs, and protein biomarkers, as well as gene fusions in cancer diagnosis. A significant portion is devoted to contrast agents, detailing modern types (iodine-based, gadolinium, barium sulfate, microbubbles, and nanoparticles) and their clinical applications in radiography, fluoroscopy, CT, MRI, and ultrasound, while addressing safety aspects and adverse reactions. Finally, the thesis explores the emerging use of probiotic microorganisms in disease diagnosis, including cancer detection. This comprehensive study highlights the importance of adjuncts in improving the accuracy and effectiveness of cancer diagnosis, paving the way for innovative and less invasive diagnostic strategies.

**Key words:** disease diagnosis, cancer diagnosis, adjuvant diagnosis, probiotic disease detection.

## ملخص

تستكشف هذه السيرة الذاتية طرق تشخيص السرطان بعمق، مع التركيز على الدور الحاسم للمساعدات الحديثة. تم إطلاقه من خلال عرض تقديمي لأساسيات بيولوجيا السرطان، بما في ذلك التعريف، والفروق بين الخلايا الطبيعية والسرطانية، والخصائص المميزة للخلايا السرطانية، وتصنيف السرطانات، وأسبابها وتطورها. تم تطوير قسم واحد إلى طرق تشخيصية متنوعة، بما في ذلك الفحص الفيزيائي لتقنيات الصور المتقدمة مثل المجهر، والتصوير المقطعي، وقياس الكثافة المقطعية (PET) ، والتصوير المقطعي بانبعث البوزيترونات (IRM) ، والتصوير بالرنين المغناطيسي (CT) ، بالإضافة إلى فيما يتعلق بالاختبارات التشخيصية وإجراءات اختبار العلامات الحيوية للأورام. تحتوي غير مرمزة، والعلامات microARN، وADN الوثيقة على العلامات الحيوية الجزيئية، وتتضمن مثيلة يتم تكريس جزء كبير من عوامل الحيوية البروتينية، بالإضافة إلى جينات الاندماج في تشخيص السرطان التباين، وتفصيل الأنواع الحديثة (على أساس اليود، الجادولينيوم، كبريتات الباريوم، الفقاعات الدقيقة والجسيمات النانوية) وتطبيقاتها السريرية في التصوير الشعاعي، والتنظير الفلوري، والتصوير المقطعي المحوسب، والتصوير بالأشعة تحت الحمراء، والتصوير بالموجات فوق الصوتية، بالإضافة إلى الجوانب الأمنية والصحية. ردود الفعل غير المرغوب فيها. وبالتالي، تستكشف المذكرة الاستخدام الناشئ للكائنات الحية الدقيقة التي تحتوي على البروبيوتيك في تشخيص الأمراض، وتتضمن اكتشاف السرطان هذه الدراسة الشاملة تسلط الضوء على أهمية المواد المساعدة في تحسين الدقة وفعالية تشخيص السرطان، مما يفتح الطريق أمام استراتيجيات التشخيص المبتكرة وأقل تدخلاً.

**الكلمات المفتاحية:** تشخيص المرض، تشخيص السرطان، التشخيص المساعد، الكشف عن الامراض عن طريق البروبيوتيك.

# ***RÉSUMÉ***

Ce mémoire explore en profondeur les méthodes de diagnostic du cancer, en mettant l'accent sur le rôle crucial des adjuvants modernes. Il débute par une présentation des fondements de la biologie du cancer, incluant sa définition, les différences entre cellules normales et cancéreuses, les caractéristiques distinctives des cellules tumorales, la classification des cancers, leurs causes et leur développement. Une section est dédiée aux diverses méthodes de diagnostic, allant de l'examen physique aux techniques d'imagerie avancées telles que la microscopie, l'échographie, la tomodensitométrie (CT), l'imagerie par résonance magnétique (IRM) et la tomographie par émission de positrons (PET), ainsi qu'aux tests diagnostiques et aux procédures de test des biomarqueurs tumoraux. Le document se penche ensuite sur les biomarqueurs moléculaires, y compris la méthylation de l'ADN, les microARN non codants et les biomarqueurs protéiques, ainsi que les gènes de fusion dans le diagnostic du cancer. Une partie significative est consacrée aux agents de contraste, détaillant les types modernes (à base d'iode, de gadolinium, de sulfate de baryum, les microbulles et les nanoparticules) et leurs applications cliniques en radiographie, fluoroscopie, CT, IRM et échographie, tout en abordant les aspects de sécurité et les réactions indésirables. Enfin, le mémoire explore l'utilisation émergente des micro-organismes probiotiques dans le diagnostic des maladies, y compris la détection du cancer. Cette étude exhaustive souligne l'importance des adjuvants dans l'amélioration de la précision et de l'efficacité du diagnostic du cancer, ouvrant la voie à des stratégies diagnostiques innovantes et moins invasives.

**Mots clés:** diagnostic de maladie, diagnostic de cancer, diagnostic adjuvant, détection de maladie probiotique.