

بسم الله الرحمن الرحيم

قال تعالى: (( وما أنتم  
بمعجزين في الأرض ولا في  
السماء

ومالكم من دون الله من ولى  
ولا نصير))

صدق الله العظيم

سوره  
العنكبوت  
الآية (22)

# **Acknowledgments**

*I would like to express my deepest gratitude to **Prof.Dr. Nafie A. AL Muslet**, my supervisor, who has been a true mentor to me during this study. I will always be grateful for the amazing patience and continued support he provided.*

*My gratitude is also expressed to **Dr. Mubarak Almahal**, my co-supervisor, for his patient support, devoted guidance and precious time. Also I wish to thank the staff of the Institute of laser in Sudan University of Science and Technology, for their friendly and helpful cooperation.*

*I thank the ministry of higher education and scientific research.*

*I extend my special thanks and appreciation to **Prof. Dr. M. A. Moharam** and **Dr. Waleed MUSAAD**, for their support*

*and valuable suggestions during my practical work in National Research Center, Egypt.*

*Special thanks are due to my colleagues at Shendi University who have shared with me an intellectual environment to work with.*

*My parents have played a central role in helping me during my studies. Their sacrifices will never be forgotten.*

*My deepest and heartfelt thank goes to my wife **Dr. Nada**. Without her endless love, patience and encouragement, this work would not have seen the light.*

*Finally, I would like to thank all my friends for their mental support, encouragement and help during the time this study was done. To all of you, I say thank you very much.*

# **Dedication**

*I dedicate this thesis*

*TO my Parents*

# *Brothers Sisters*

*And  
TO my  
Wife (Dr.  
Nada)*

*Essam*

## **Abstract**

Bladder cancer is one of the most common cancers in Africa. It takes several days to reach a diagnosis using histological examinations of specimens obtained by endoscope, which increases the medical expense.

Spectroscopic analysis of bladder cancer tissues has received considerable attention due to its sensitivity to biochemical variations in the samples.

The present study investigated the use of FTIR and laser Raman spectrometer as a diagnose tools of bladder cancer.

Fourty two bladder samples were collected from 21 patients during surgery from different hospitals without any pretreatment.

**FTIR, with a ceramic source, was used to** differentiate between normal and cancerous bladder tissues via the change in the spectra of these samples.

The investigations detected obvious spectroscopic change in the proteins (1650, 1550  $\text{cm}^{-1}$ ), lipids (2925, 2850  $\text{cm}^{-1}$ ) and nucleic acid (1080, 1236  $\text{cm}^{-1}$ ).

**With FT Raman spectrometer supplied by Nd:YAG laser, as an excitation source, some of the samples were studied and a significant difference between the normal and cancerous bladder tissues were found around Raman shifts of 1650  $\text{cm}^{-1}$ , 1440  $\text{cm}^{-1}$ , 1270  $\text{cm}^{-1}$  and 1080  $\text{cm}^{-1}$ .**

The comparison between the two techniques showed that Raman spectroscopy holds much promising as a rapid, accurate, nondestructive method, and easy to use as an alternative method for identification and diagnosis of bladder cancerous tissues.

## المستخلص

سرطان المثانة يعتبر من أكثر أنواع السرطانات شيوعاً في القارة الأفريقيا. يأخذ التشخيص العادى للمرض عدة ايام للوصول لفحص النماذج التي يحصل عليها الطبيب بواسطة المنظار ثم يرسلها الى معمل التحليلات المرضية مما يزيد النفقات المالية للتشخيص.

التحليل الطيفى لأنسجة سرطان المثانة بدأ يحظى باهتمام كبير في الازمنة الاخيرة بسبب تحسسه للاختلافات الكيماوية

الحاصلة في الخلايا الحيوية في العينات مما يساعد في توفير  
تشخيص سريع ودقيق وأقل كلفة لهذا المرض.  
تتحرى الدراسة الحالية امكانية استعمال تحويلات فورير  
للاشعة تحت الحمراء و تحويلات فورير لرامان، كأدوات تشخيصية  
لسرطان المثانة.

في هذه الدراسة تم فحص 42 عينة جمعت من 21 مريض  
أثناء جراحة المثانة من مستشفيات مختلفة قبل اجراء اى معالجة.  
تحويل فورير للاشعة تحت الحمراء الذي له مصدر خزفي،  
أستعمل ليفرق بين أنسجة المثانة الطبيعية والسرطانية حيث تم  
تحديد فروقات طيفية بين النوعين من الانسجة في: البروتين (  $1650, 1550$  سم<sup>-1</sup> , والدهون (  $2925, 2850$  سم<sup>-1</sup> ) و  
الحامض النووي (  $1080, 1236$  سم<sup>-1</sup> ).

كذلك تم استخدام مطياف رامان الذي يستخدم ليزر  
Nd:YAG كمصدر إثارة لدراسة عدد من هذه العينات حيث سجلت  
اختلافات طيفية هامة بين أنسجة المثانة الطبيعية والسرطانية وتم  
تحديد ازاحات رامان حول المناطق  $1650$  سم<sup>-1</sup> ,  $1440$  سم<sup>-1</sup> ,  
 $1270$  سم<sup>-1</sup> و  $1080$  سم<sup>-1</sup>.

وبالمقارنة بين الطريقتين، نستخلص أن تحويلات فورير  
لرامان يمكن اعتمادها كتقانة واعدة جدا في تشخيص سرطان  
المثانة وذلك لانها تقانة دقيقة و سريعة , غير إتلافية، وسهلة  
الاستعمال كبديل للطرق التقليدية في تشخيص التغيرات  
السرطانية لانسجة المثانة.



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