بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

Faculty of Pharmacy Ain Shams University in Cairo

The Diagnostic Utility of Tumor Suppressor or Oncogenic Small Biomarkers in Association with LncRNA in Breast Cancer

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Pharmacy in Biochemistry

By

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I, Marwa Magdy Mahmoud Mohamed,

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Thesis Title: The Diagnostic Utility of Tumor Suppressor or Oncogenic Small Biomarkers in Association with LncRNA in Breast Cancer

Thesis type: ● M.SC. ○ PhD

I confirm that:

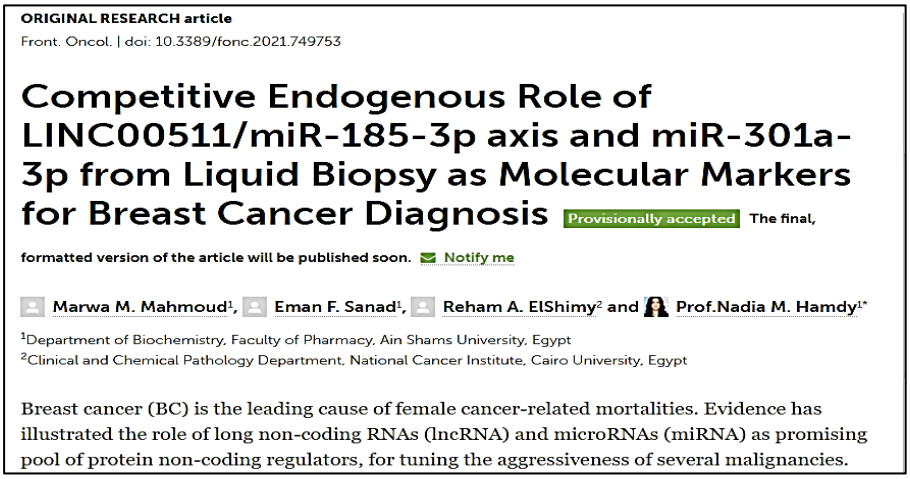
- This work was done wholly or mainly while in candidature for a research degree at the Ain Shams University in Cairo.
- Where anywhere I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. Except for such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Journal Manuscripts in Peer reviewed Journals

1. ***Competitive Endogenous Role of LINC00511/miR-185-3p axis and miR-301a-3p from Liquid Biopsy as Molecular Markers for Breast Cancer Diagnosis***

Marwa M. Mahmoud, Eman F. Sanad, Reham A.A. Elshimy, Nadia M. Hamdy

Frontiers in Oncology| Breast Cancer Section | doi: 10.3389/fonc.2021.749753.



ORIGINAL RESEARCH article

Front. Oncol. | doi: 10.3389/fonc.2021.749753

Competitive Endogenous Role of LINC00511/miR-185-3p axis and miR-301a-3p from Liquid Biopsy as Molecular Markers for Breast Cancer Diagnosis Provisionally accepted The final, formatted version of the article will be published soon. Notify me

Marwa M. Mahmoud[1], Eman F. Sanad[1], Reham A. ElShimy[2] and Prof.Nadia M. Hamdy[1*]

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Breast cancer (BC) is the leading cause of female cancer-related mortalities. Evidence has illustrated the role of long non-coding RNAs (lncRNA) and microRNAs (miRNA) as promising pool of protein non-coding regulators, for tuning the aggressiveness of several malignancies.

2. *MicroRNAs Role in Non-Communicable Diseases and Link to Multidrug Resistance, Regulation or Alteration*

Marwa M. Mahmoud, Eman F. Sanad & Nadia M. Hamdy. (Narrative Review)

Environmental Science and Pollution Research, 2021 Jul; 28(28):36984-37000

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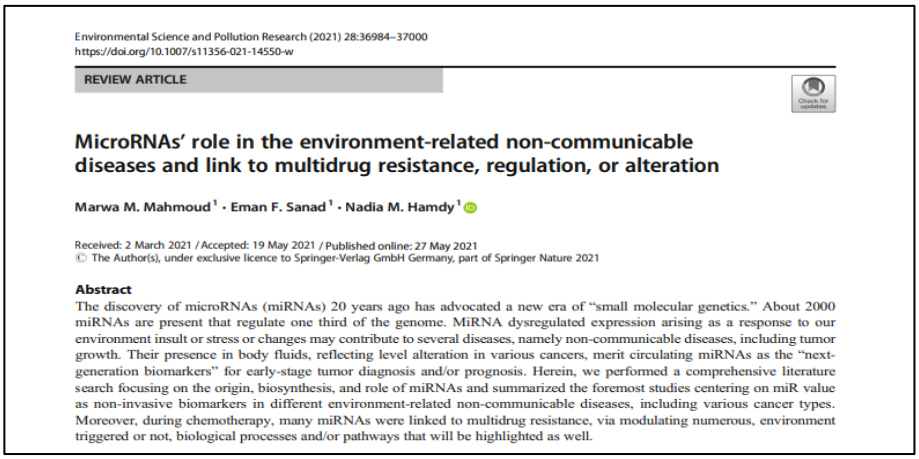

Environmental Science and Pollution Research (2021) 28:36984–37000
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REVIEW ARTICLE

MicroRNAs' role in the environment-related non-communicable diseases and link to multidrug resistance, regulation, or alteration

Marwa M. Mahmoud[1] · Eman F. Sanad[1] · Nadia M. Hamdy[1]

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Abstract

The discovery of microRNAs (miRNAs) 20 years ago has advocated a new era of "small molecular genetics." About 2000 miRNAs are present that regulate one third of the genome. MiRNA dysregulated expression arising as a response to our environment insult or stress or changes may contribute to several diseases, namely non-communicable diseases, including tumor growth. Their presence in body fluids, reflecting level alteration in various cancers, merit circulating miRNAs as the "next-generation biomarkers" for early-stage tumor diagnosis and/or prognosis. Herein, we performed a comprehensive literature search focusing on the origin, biosynthesis, and role of miRNAs and summarized the foremost studies centering on miR value as non-invasive biomarkers in different environment-related non-communicable diseases, including various cancer types. Moreover, during chemotherapy, many miRNAs were linked to multidrug resistance, via modulating numerous, environment triggered or not, biological processes and/or pathways that will be highlighted as well.

Accepted Abstracts in International Conferences

1. LncRNA LINC00511 from Newly Diagnosed Egyptian Breast Cancer Female Patients Liquid Biopsy; A Tale of a Promising Diagnostic Molecular Biomarker."
Marwa M. Mahmoud, Eman F. Sanad, Reham A.A. Elshimy, Nadia M. Hamdy
6th Annual International Remote Conference- Beyond Science Initative- Science and Society Conference 2021, Toronto, Canada,21st -27th February 2021
Our presentation was honored with the Paolo Sassone-Corsi Top presenter award in the (Live-Talk presentation)

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Full Name: Marwa Magdy Mahmoud Mohamed Date: 10/2021

Signature:

6th Annual International Remote Conference
SCIENCE & SOCIETY
February 20-21, 2021
BEYOND SCIENCES INITIATIVE

Conference Registration and Abstract Submission

Authors and affiliations *

List the authors' names first, indicating their affiliations with a number value, formatted as in the example above. Skip one line, then specify these institutional affiliations in the format: department, institute, city, country.

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Abstract *

Background: Among Egyptian females, breast cancer (BC) is the leading cause of cancer related mortalities. Recently, emerging evidence has illustrated the vital role of long non-coding RNAs (lncRNAs) as promising pool of regulators for tuning the aggressiveness of several solid malignancies. However, this still needs further investigations regarding Egyptian BC patients. This research aims to unravel the expression pattern and to put emphasis on the diagnostic value of the long intergenic non-protein coding RNA00511 (LINC00511) in newly diagnosed Egyptian female BC patients.

Methods: LINC00511 was chosen from database then validation and molecular binding were confirmed using bioinformatics analysis. LINC00511 expression was measured in healthy (20) and naïve BC patients (70) using qRT-PCR. The association between LINC00511 expression and clinicopathological features was assessed as well as the receiver operating characteristic (ROC) curve was blotted to determine the best cutoff point that discriminates between cancer and noncancer groups. The best cutoff point was used to calculate sensitivities and specificities for LINC00511, to weigh out its diagnostic efficacy over other classical protein biomarkers, namely CA15.3 or CEA.

Results: LINC00511 was highly expressed in the BC patients when compared to controls (2.5(0.018-21.77) vs. 0.008(0.0002-0.97), respectively, at P <0.006). LINC00511 levels were correlated with BC risk factors, clinicopathological and demographic factors. Additionally, LINC00511 levels were positively correlated with the aggressiveness of the disease as manifested in patients with larger tumor volume (>2 Cm, P <0.0001), lymph-node metastasis (P <0.0001) and advanced tumor grade (P <0.031).

LINC00511 was found to be elevated in early-stage BC patients when compared to advanced late-stages (P <0.0003). LINC00511 showed AUC equals 0.98 (95% CI, 0.925-0.998, P <0.0001) being superior to conventional tumor markers.

In conclusion, our data highlights LINC00511 pivotal role for diagnosis as well as in determining aggressiveness of BC.

Representing a novel, promising diagnostic molecular biomarker for BC patients, LINC00511 might play part in BC pathogenesis and/or progression either alone or in association with microRNAs as miR-185-3p or miR-301a; suggested by bioinformatics, are now studied by our group.

And, to get the complete picture, we currently started to study LINC00511 SNPs in BC as well.

Brief biography

I, **Marwa Magdy**, am an academic pharmacist and researcher. I obtained my BSc in May 2017 in pharmaceutical science at the Faculty of Pharmacy, Ain Shams University with a percentage of 92.62 % and general grade Excellent with Honor. I started my MSc degree in the Department of Biochemistry and Molecular Biology at Faculty of Pharmacy Ain Shams University with general GPA 4 on scale 4.0 with a specialization in oncology and genetics.

Being passion for learning new things, I have attended over 10 international workshops, online courses in field of statistics, bases of bioinformatics, genomics, epigenetics and research ethics, stem cells such as The International Winter School on Bioinformatics Nile University (sponsored by DAAD in 2019), Computational biology and Bioinformatics research Genes to Pathways - Second edition (in 2021), and many others with two years of experience focusing on gene expression and PCR techniques. Proficient in all phases of extraction and testing. Excels at delivering high-quality, rigorously tested results. Adepts at refining and optimizing testing and development protocols. Familiar with a range of lab equipment, excellent communicator who is able to explain highly technical ideas to technical/non-technical audience. Top teamwork and leadership skills, takes pride in mentoring new team members. Organized and well-spoken, able to work as member of cross-functional team.

Pushing me to my limits and beyond, me and my supervisors were honored with the Paolo Sassone-Corsi Top presenter award in my very first chance as a speaker in the 6th Annual International Remote Conference- Beyond Science Initiative- Science and Society Conference 2021, Toronto, Canada,21st -27th February 2021. We have also managed to publish two papers out of my MSc work in two different prestigious journals with me being the first author.

Acknowledgment

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my research work to complete the research successfully.

When all is said and done, I would like to express my profound gratitude to **Prof. Dr. Nadia Hamdy**, my main supervisor, who encouraged me in this MSc project and believed in my capacity to accomplish it. I am very grateful for her permanent support, scientific guidance and encouragement throughout this long walk with all its "ups and downs".

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I am extremely grateful to my dearest parents, being raised by two academic professors of course this drive me to love knowledge, taught me how to be organized and do everything in my life with great sincerity. I deeply thank you both for your love, prayers, caring and sacrifices for educating and preparing me for my future. **Dady,** you were always the main reasons to keep me going, as I have inherited from you being optimistic and workaholic. **Mamy**, I would have never done it without you literally. I think there is no Mum on earth that pampers her kids the way you do. You are unique and beautiful inside out. May Allah bless you and grant you all the happiness in this world. You taught us the real meaning of "unconditional love". You are everything for me. Love you endlessly. Thank you for supporting me financially and thank you for your care. Literally, both of you are a great gift from Allah. I LOVE YOU.

I am very much thankful to my lovely superhero sister **Manar,** for her endless

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Dedication

To:

My wonderful and super incredible family

for their endless love, support, and

continuous care

&

My Colleagues of Biochemistry Dept.

TABLE OF CONTENTS