

A PhD student at AUB makes a breakthrough in detecting and treating lung cancer

The new medical discovery hails the Lebanese record of scientific achievements

Beirut, October 21, 2018: Adding a new discovery to its record of remarkable academic and research achievements in Lebanon, the American University of Beirut (AUB) announced that Dr Athar Khalil who recently completed her PhD thesis in Biochemistry and Molecular Genetics at the Faculty of Medicine, discovered a direct link between four new genes (TBX2-5) and lung cancer. This discovery will have a major impact on the early diagnosis and the treatment of lung cancer which remains the leading cause of death amongst all types of cancers. The medical research was led under the supervision of Professor Georges Nemer , and in collaboration with researchers from AUB-FM, and the MD-Anderson cancer center in the USA.

“The re-initiation and funding of the PhD program in Medical Sciences under the leadership of the Dean Dr. Mohamed H. Sayegh at the Faculty of Medicine at AUB paved the way to recruit the best students from all over Lebanon like Athar Khalil to realize their dreams,” said Dr. Georges Nemer, Professor of Biochemistry and Molecular Genetics. “Our discoveries not only would have major impact on the early diagnosis of lung cancer, which remains the leading cause of death amongst all types of cancer, but they could be used to develop novel drugs that mimic the activities of TBX2-5 which could represent a potential therapeutic approach to treat lung cancer,” added Dr. Nemer.

The results point out to a consistent downregulation of the (TBX2-5) genes in lung adenocarcinomas from 5 large cohorts of patients from around the globe. For the first time, these genes could be used in early diagnosis of lung cancer as a reliable test, while their activities represent a novel therapeutic approach to treat lung cancer.

“The discovery of a direct link between TBX2-5 suppression to lung adenocarcinomas will pave the way for the usage of these as the earliest biomarkers to be tested on individuals at high risk, especially smokers,” said Dr. Athar Khalil, PhD graduate in Biomedical Sciences. “Medical basic research is not a field that girls and women should be avoiding when making a career decision. We should approach it as a noble cause like medicine, because our research could have major impact on our families and societies where women play a major role,” she concluded. Indeed, our analysis of public data generated from clinical and genetic tests on smokers conducted in the USA, showed that these genes could discriminate with high accuracy those smokers who would develop lung cancer from those who would not.

Finally, the results suggest that the re-expression of any one of the TBX genes in lung cancer cell lines, lead to a programmed cell death associated with a dramatic decrease in cell proliferation. Data analysis showed that the common mechanism by which these factors execute their effect is through a demethylating pathway. These findings provide indirect evidence that demethylating agents currently in clinical trials could be potentially used alone or in combination with other drugs in treating lung cancer. The results of the thesis some of which already was published in Oncotarget [\[1\]](#) and some under review in Frontiers Oncology represent a first worldwide analysis of the role of the T-box family member (TBX2-5) in lung cancer.

Lung cancer incidence rates in Lebanon are among the highest in the region for both males and females; these are consistent with the smoking habits in the Lebanese population compared to neighboring countries. A notable increase in smoking related cancers is mimicking previous smoking habits among females. The significant increase in these rates is expected since recent figures show that smoking habits between males and females in Lebanon are now nearly comparable with 45% for males and 30% for females ^[2]. According to the World Health Organization (WHO), 7.6 million deaths globally each year are caused by cancer representing 13% of all global deaths. Lung cancer is by far the number one cancer killer (1,370,000 deaths per year) ^[3].

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References:

- [1 - http://www.oncotarget.com/index.php?journal=oncotarget&page=article&op=view&path\[\]=19938](http://www.oncotarget.com/index.php?journal=oncotarget&page=article&op=view&path[]=19938)
- [2- https://www.syndicateofhospitals.org.lb/Content/uploads/SyndicateMagazinePdfs/5371_14-17.pdf](https://www.syndicateofhospitals.org.lb/Content/uploads/SyndicateMagazinePdfs/5371_14-17.pdf)
- [3- https://www.medicalnewstoday.com/info/lung-cancer](https://www.medicalnewstoday.com/info/lung-cancer)

About AUBMC

Since 1902, AUBMC has been providing the highest standards of care to patients across Lebanon and the region. It is also the teaching hospital for the Faculty of Medicine at AUB (established in 1867), which has trained generations of medical students and physicians, and whose graduates can be found at leading institutions around the world. AUBMC is the only medical institution in the Middle East to have earned the five international accreditations of JCI, Magnet, CAP, ACGME-I and JACIE attesting to its superior standards

in patient-centered care, nursing, pathology/laboratory services and graduate medical education.

The Faculty of Medicine has graduated over 4,000 medical students and physicians; the Rafic Hariri School of Nursing provides excellent education for the nursing staff, and the Medical Center meets the healthcare needs of over 360,000 patient visits annually.

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About Athar Khalil

Athar Khalil is the first student to complete her PhD project in 3 years and earn her degree in Biochemistry and Molecular Genetics at the faculty of Medicine at 26 years old. Her work has resulted in 3 major publications in prestigious journals and participation in the American Association for Cancer Research annual meeting in Chicago (April 2018) with two posters. She was a recipient of the LNCSR PhD fellowship and her project was supported by grants from MPP and URB.

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