

Professor Eric Lim: blood-based genetic test, a brave try to detect non-smoking lung cancer

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Background

During the 23rd European Conference on General Thoracic Surgery (2015 ESTS) held in Lisbon this year, we were honored to have an interview with Professor Eric Lim, who is devoted to the researches on non-smoking lung cancer. In the interview, Professor Lim has particularly shared his knowledge and views on the blood-based genetic test for lung cancer screening, which even covers non-smoking population.

Mr Eric Lim is a Consultant Thoracic Surgeon at the Royal Brompton Hospital and Reader in Thoracic Surgery at the National Heart and Lung Institute of Imperial College London (*Figure 1*). He received his undergraduate medical education at the University of Sheffield Medical School. His specialist heart and lung surgical training was at Papworth Hospital in Cambridge and the Royal Brompton Hospital in London. He spent time in medical research in Cambridge where he was awarded a Doctorate of Medicine and in research methods London where he received his Masters of Science in Medical Statistics funded by a UK Medical Research Council Scholarship.

Mr Lim is a sub-specialist in Thoracic Surgery with specific expertise in lung and other chest cancers. His technical expertise is minimally invasive (keyhole) surgery for lung cancer, pleural effusion, pneumothorax and other chest cancers, as well as complex surgery for advanced lung cancer involving airway and blood vessel reconstruction (to save as much normal lung as possible).

He has an active interest in clinical and translational research. He is the Chief Investigator leading UK wide multicentre trials of surgery for mesothelioma (MARS 2) and VATS lobectomy (VIOLET). He is the head of the Biomedical Research Unit Cancer Consortia and leads a team of translational researchers focusing on blood based cancer diagnosis and predictive testing aspiring to shorten time to diagnosis and eliminate complications of



Figure 1 Eric Lim, MB ChB MD MSc FRCS(C-Th). Consultant Thoracic Surgeon, Royal Brompton Hospital; Reader in Thoracic Surgery, National Heart and Lung Institute, Imperial College London.

conventional invasive tissue biopsy.

His research has led to over 90 peer review publications, he has authored two award winning textbooks (*Medicine and Surgery, Churchill's Pocketbook of Differential Diagnosis*) and six book chapters. Mr Lim chaired the British Thoracic Society and Society for Cardiothoracic Surgery's Guidelines on the Management of Lung Cancer in 2010, contributed to the European Society of Medical Oncology Early Stage Lung Cancer Guidelines in 2013 and European Neuroendocrine Tumours Management of Bronchopulmonary Carcinoids Guidelines in 2014.

He also the Chair of the UK Thoracic Surgery Research Collaborative and served as a Councillor of the European Society of Thoracic Surgeons, a member of the Steering Committee of the British Thoracic Oncology Group, an Associate Editor of *Thorax* and the Deputy Statistics Editor for the *Journal of Thoracic and Cardiovascular Surgery*.

Interview

TLCR: *As we know, you are researching on the non-smoking lung cancer. Could you kindly introduce the basic situation of the non-smoking lung cancer, such as the incidence and it's developing trend? And why do you choose to study non-smoking lung cancer?*

Prof. Lim: In England the incidence of non-smoking lung cancer has doubled in the last seven years. At the Royal Brompton Hospital in London, about 30% of all the operations are performed in patients who have never smoked. We feel that this is slowly becoming an epidemic and we want to find out how we can best identify and tackle this early.

Although the incidence is slowly increasing year by year, the real difficulty is that we cannot find any risk factors. For nonsmoking lung cancer, people like you and me are at risk and because there are so many people who do not smoke, we cannot identify those who are at risk. It becomes a very difficult clinical problem. So far for no reason, otherwise fit healthy people develop symptoms usually at advanced stage like cough and hematemesis, and I find that they are very hard to live with. So I think it is important that we actually research to find out how we can better detect these patients.

TLCR: *What are the major factors that cause the non-smoking lung cancer?*

Prof. Lim: We do not know so far. We think it is a bad luck. Another one of our papers presented at the world conference refers to Thomasetti's and Vogelsteins publication in *Science* commenting that patients' risk of individual cancer depends more on stem cell division rate. Because the lung has a very high division rate of normal stem cells, anything small that goes wrong tends to pre dispose to the development of cancer. So in general, in the vast majority of cancer mathematics rather than environmental exposure is responsible for the development of the actual cancer. And that is why they proposed in *Science* that cancer is mainly due to bad luck rather than environmental exposures.

TLCR: *What main research is your team conducting on the non-smoking lung cancer so far?*

Prof. Lim: We are looking at a non-smoking lung cancer database to find out genetic markers, and we are developing blood-based genetic tests to identify who in the population would be predisposed to lung cancer. It doesn't matter whether they are smokers or nonsmokers.

He. Blood-based genetic test to detect non-smoking lung cancer

TLCR: *How does the blood-based genetic test function to screen lung cancer?*

Prof. Lim: All cancers have genetic mutations, and what we do is identify 80% of all the genetic mutations of squamous carcinoma and adenocarcinoma, and use that gene panel and detect it in the blood. We think this is a particularly useful in non-smoking lung cancer. In smoking lung cancer we identify high-risk patients by their smoking history, in nonsmoking lung cancer, everyone may be susceptible, and a blood test is much more easier to launch at population level rather than a screening CT program for example.

TLCR: *What is the tricky problem that still hinders the blood-based genetic test from going into common use?*

Prof. Lim: Every test has a sensitivity and specificity. We think that genetic markers in the blood in general have low sensitivity, but our test has high specificity. Regarding the results of our test, we presented it in Denver.

TLCR: *It remains to be further explored to find out an effective way to detect lung cancer as early as possible. What do you think will be the promising technique for early detection of lung cancer in the future?*

Prof. Lim: Apart from blood-based molecular biomarkers, the most successful early detecting technique is screening CT. But that in general is applied to high-risk population. There is no formal screening method for patients who are at low risk or developing lung cancer, which is the non-smoking population.

TLCR: *It is still controversial about the management of early-stage lung cancer, surgery or SBRT? As a consultant thoracic surgeon, how do you look at this issue?*

Prof. Lim: I think that ultimately this will be decided by clinical trials. It may be the case that patients' preference drives which form of treatment, but my personal opinion is that we will offer lung resection, we will do a lobectomy not a wedge resection. SBRT is the same as doing a wedge resection, because you only address the tumor. In the past, there was a clinical trial called LCSG 832 which surgeons either did a lobectomy or only took the cancer out. If one only took cancer out, you have a higher risk of cancer recurrence. I believe that the future surgery and SBRT trials

will show the same results.

TLCR: Thank you very much for your precious time!

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None.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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