

Researchers reveal lung cancer can stay hidden for over 20 years

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Lung CA seen on CXR. Credit: [CC BY-SA 4.0](#) James Heilman, MD/Wikipedia

Cancer Research UK scientists have discovered that lung cancers can lie dormant for over 20 years before suddenly turning into an aggressive form of the disease, according to a study published in *Science* today.

The team studied lung cancers from seven patients – including smokers, ex-smokers and never smokers. They found that after the first genetic mistakes that cause the cancer, it can exist undetected for many years until new, additional, faults trigger rapid growth of the disease.

During this expansion there is a surge of different genetic faults appearing in separate areas of the tumour. Each distinct section evolves down different paths – meaning that every part of the tumour is genetically unique.

This research – jointly funded by Cancer Research UK and the Rosetrees Trust – highlights the need for better ways to detect the disease earlier. Two-thirds of patients are diagnosed with advanced forms of the disease when treatments are less likely to be successful.

By revealing that lung cancers can lie dormant for many years the researchers hope this study will help improve early detection of the disease.

Study author Professor Charles Swanton, at Cancer Research UK's London Research Institute and the UCL Cancer Institute, said: "Survival from [lung cancer](#) remains devastatingly low with many new targeted treatments making a limited impact on the disease. By understanding how it develops we've opened up the disease's evolutionary rule book in the hope that we can start to predict its next steps."

The study also highlighted the role of smoking in the development of lung cancer. Many of the early genetic faults are caused by smoking. But as the disease evolved these became less important with the majority of

faults now caused by a new process generating mutations within the tumour controlled by a protein called APOBEC.

The wide variety of faults found within lung cancers explains why targeted treatments have had limited success. Attacking a particular genetic mistake identified by a biopsy in lung cancer will only be effective against those parts of the tumour with that fault, leaving other areas to thrive and take over.

Over 40,000 people are diagnosed with lung cancer each year and, despite some positive steps being made against the disease it remains one of the biggest challenges in cancer research, with fewer than 10 per cent surviving for at least five years after diagnosis.

Building on this research will be a key priority for the recently established Cancer Research UK Lung Cancer Centre of Excellence at Manchester and UCL. The Centre – where Professor Swanton is joint centre lead – is a key part of Cancer Research UK's renewed focus to beat lung cancer; bringing together a unique range of internationally renowned scientists and clinicians to create an environment that catalyses imaginative and innovative lung cancer research.

Professor Nic Jones, Cancer Research UK's chief scientist, said: "This fascinating research highlights the need to find better ways to detect lung cancer earlier when it's still following just one evolutionary path. If we can nip the disease in the bud and treat it before it has started travelling down different evolutionary routes we could make a real difference in helping more people survive the disease.

"Building on this work Cancer Research UK is funding a study called TRACERx which is studying 100s of patient's lung cancers as they evolve over time to find out exactly how lung cancers mutate, adapt and become resistant to treatments "

More information: de Bruin, E.C. et al. Spatial and temporal diversity in genomic instability processes defines lung cancer evolution. *Science* (2014). www.sciencemag.org/lookup/doi/10.1126/science.1253462

Provided by Cancer Research UK

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