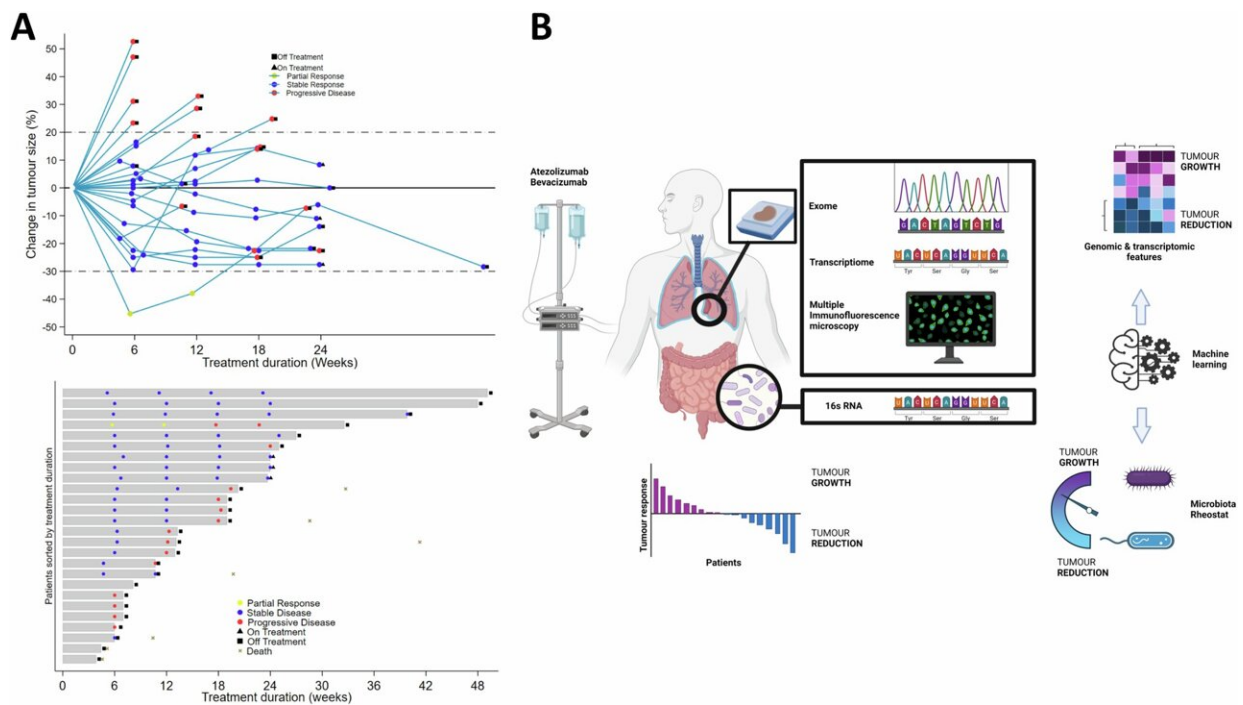


Gut bacteria influence responses to immunotherapy in mesothelioma patients, study finds

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Efficacy and multi-omic analysis workflow in MIST4. Credit: *Nature Communications* (2024). DOI: 10.1038/s41467-024-49842-5

A cancer study has found that certain gut bacteria may influence whether or not a patient's immune system is successful in fighting mesothelioma, an aggressive form of cancer.

It has led experts to believe that in the future, dietary changes could improve the benefits of [treatment](#). The [study](#) has now been published in *Nature Communications*.

Over the past 20 years, the University of Leicester's Professor of Thoracic Oncology, Dean Fennell, a fellow of the academy of medical sciences, has led the development and improvement of treatment for [mesothelioma](#).

Mesothelioma is an aggressive form of cancer which develops in the lining of the lungs or abdomen, and is known to be caused by exposure to the now-outlawed industrial material, asbestos.

It is a relatively rare disease, but a devastating one. There is no current cure for mesothelioma, with treatments seeking to extend and improve the quality of life.

The focus of this research has been to identify personalized treatment pathways for patients with relapsed mesothelioma. Thus far, by identifying which patients are likely to get the greatest benefit from different types of drug therapies, using the genetics of the cancer to lend insights.

In the most recent paper from Professor Fennell's MIST trials, the research team evaluated the effectiveness of two immunotherapies; atezolizumab and bevacizumab, in patients with relapsed mesothelioma.

Professor Fennell said, "We have seen that the immunotherapies we used to treat patients in this study, using immune checkpoint blockade, can achieve clinically meaningful control of mesothelioma in a proportion of patients.

"The ecosystem of bacteria that live in everyone's intestines have

emerged in recent years as a significant factor associated with the body's sensitivity to immunotherapy.

"We wanted to find out how factors both inside and outside of the cancer per se, were influencing a patient's response to immunotherapy.

"We therefore sequenced the genetic code of the [gut bacteria](#) from patients in this study, to establish whether there was a relationship with their responsiveness to treatment."

For the study, 26 patients with relapsed mesothelioma took part. Their average age was 68 and on average they received 4.5 cycles of immunotherapy. The patient's disease control rate after 12 weeks was assessed.

The study observed that a positive patient response was more likely if there were more anti-cancer immune cells seen in the mesothelioma. In turn, this was associated with the presence or absence of specific gut bacteria; namely *Provetella*, *eubacterium ventriosum* group and *biophilia*.

Professor Fennell concluded, "Our work builds on a growing understanding that factors outside of the cancer per se, in this case bacteria, which live with us in the gut, can be critical to the success of immunotherapy.

"A key implication of our work is that changing the gut microbiome might improve the odds of patient benefit to immunotherapy. This could be, for example, through specific changes to the diet such as increased fiber intake; something that can be actioned by the patient.

"Ongoing work will explore this question, with further evidence being sought from other MIST trials that have now completed patient

enrollment. We look forward to seeing where this research leads."

Dr. Samantha Walker, Director of Research and Innovation at Asthma + Lung UK, said, "With mesothelioma treatment seeing only slow progress for several decades, and current treatments not working particularly well, these results will bring real hope to the thousands of people affected by mesothelioma. It's truly remarkable to discover that something as simple as the food someone eats could have the potential to improve their response to immunotherapy.

"Results like this demonstrate why it's so important to fund research. Every five minutes in the UK, someone dies from a lung condition. Thousands more live with the terror of struggling to breathe every day—and yet lung health research is still desperately underfunded. At Asthma + Lung UK we're fighting for more life-changing, life-saving research to transform the future for everyone living with breathing problems."

More information: Min Zhang et al, A gut microbiota rheostat forecasts responsiveness to PD-L1 and VEGF blockade in mesothelioma, *Nature Communications* (2024). [DOI: 10.1038/s41467-024-49842-5](https://doi.org/10.1038/s41467-024-49842-5)

Provided by University of Leicester

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