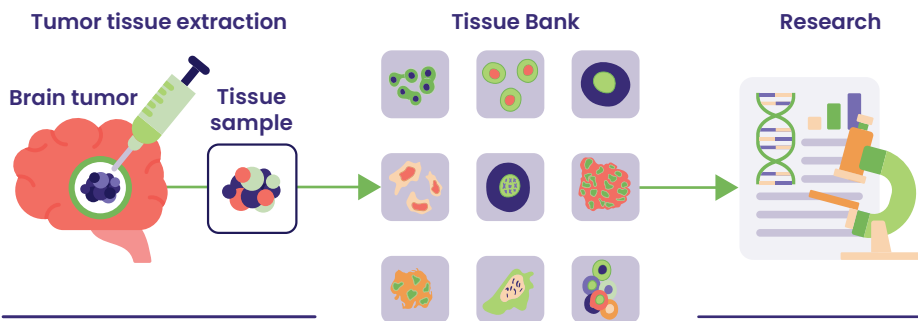


Making Headway Foundation's investments have led to **revolutionary new research** that improves treatment for children with rare brain and spinal cord tumors.

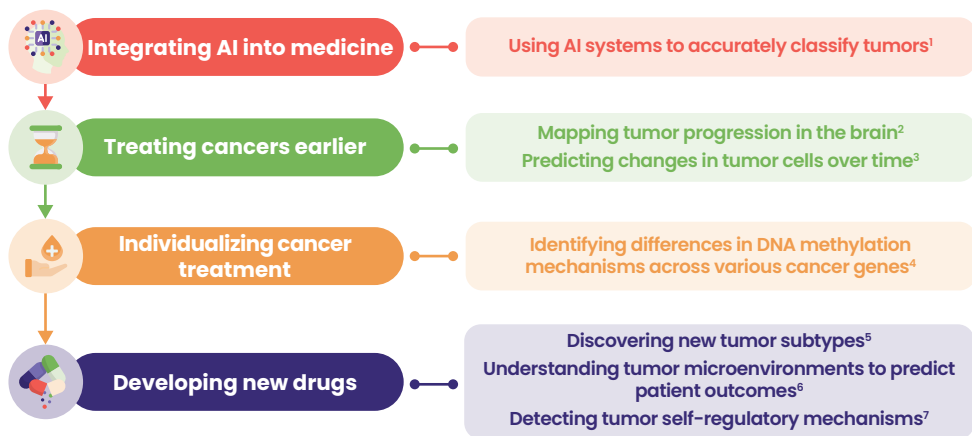
In just 5 years – extremely quickly by medical standards – these research breakthroughs have directly helped patients around the world get faster and more accurate diagnoses. It was all made possible by our funding of the NYU Pediatric Brain and Nervous System Tumor Research Registry and Tissue Bank.



Since we started funding the Tissue Bank, it has collected 2,153 brain tumor samples from 550 different patients.

These tissue samples have been studied by researchers to conduct innovative research.

Through state-of-the-art research on the tissues collected through the Tissue Bank, combined with advancements in artificial intelligence (AI), researchers have developed a powerful diagnostic tool called DNA methylation analysis, which is already helping patients by:



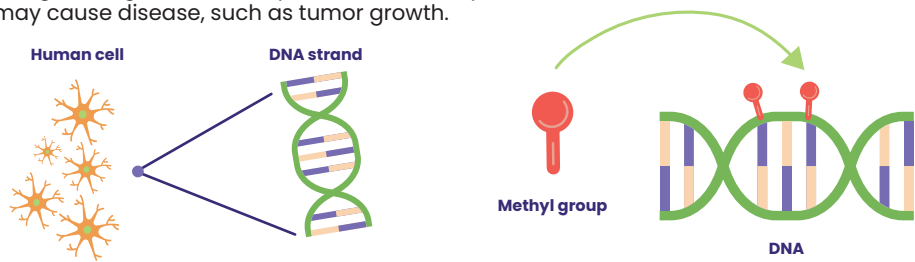
Medical advancements from DNA methylation analysis research are already reducing toxicity, limiting side effects, and saving lives by making sure patients get the **correct diagnosis** and the **most effective treatments** for their cancer.

What is DNA methylation?

DNA is the molecule that contains our genetic information inside our cells.

Genes are sequences of DNA. Each gene you have is responsible for a different thing your body does, from the color of your hair to how you grow; a gene that is expressed incorrectly may cause disease, such as tumor growth.

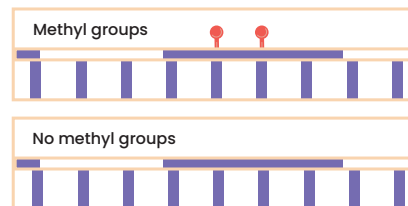
DNA methylation is the process of adding molecules called methyl groups onto DNA strands.



Among its key functions, DNA methylation can:

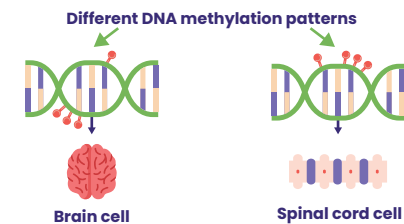
1. Change the activity of a gene

Patterns of DNA methylation can determine whether or not a gene is expressed. In other words, these markers can act as an "on" or "off" switch for different functions in a cell.



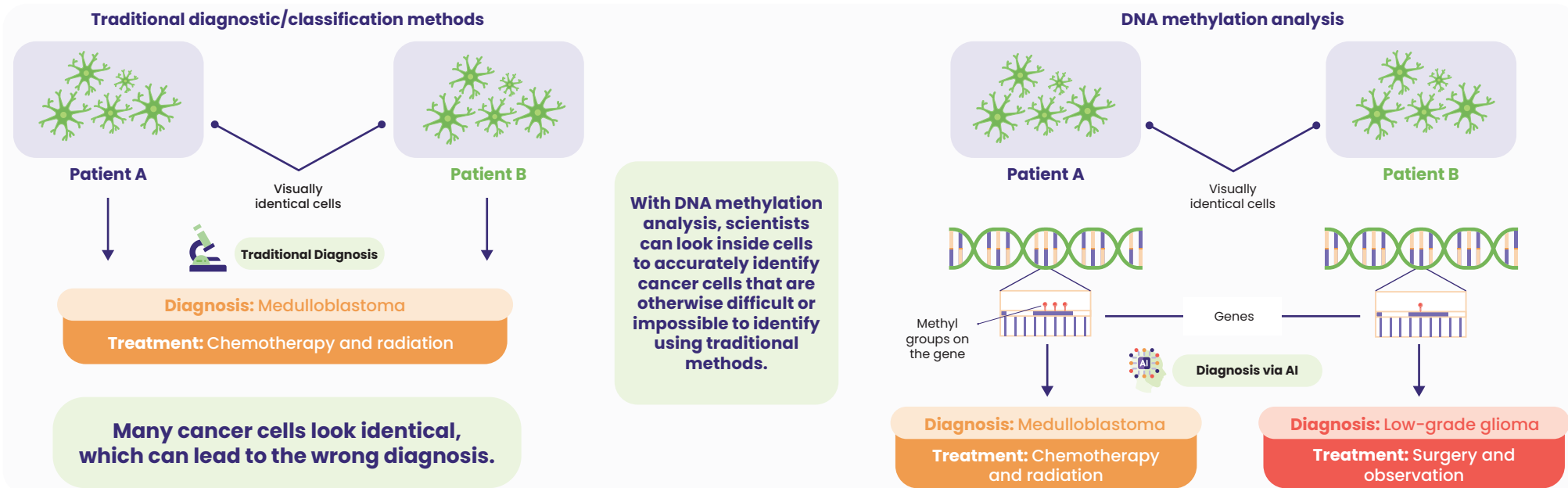
2. Act as marker

DNA methylation patterns found in tumor cells can be analyzed to identify where a tumor started, providing important information that tells doctors about what type of tumor it is and what treatment it requires.



How is DNA methylation analysis used for cancer diagnosis?^{1, 8}

Different brain tumors need different treatments, so correctly diagnosing which type of tumor a patient has is very important.



3 in 25 people with brain tumors receive the **wrong diagnosis**⁸



When a patient receives an accurate diagnosis...

...they can receive the right treatment, and avoid unnecessary, less effective, and extremely toxic treatments.

Using DNA methylation analysis for diagnosis ensures that patients receive an accurate diagnosis from the start.

Why is DNA methylation research important?

DNA methylation analysis is shaping:

The way existing cancer treatments are used

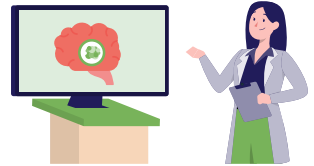
While new and innovative cancer medications are always being developed, these medications can only be fully effective if the diagnosis is correct.

The development of new cancer treatments

Identifying new tumor subtypes supports the development of new drugs by directing scientists where to focus their research.⁵

DNA methylation analysis is paving the way for patients to get faster and more accurate diagnoses.

Using DNA methylation analysis as a diagnostic tool is a recent breakthrough, and it is an important step towards a cure. These discoveries were made possible in part through Making Headway's independent funding of the Tissue Bank.



The Making Headway Foundation is a small, but intensely focused non-profit organization. Through our funding, we helped build the infrastructure for the development of a **breakthrough diagnostic tool**. DNA methylation analysis is not only helping children in our community, but around the globe. Based on the tissue samples collected, and the groundbreaking work of NYU Molecular Pathologist Dr. Matija Snuderl, **the World Health Organization (WHO) has begun to change how they classify brain tumors.**⁹

Globally, as many as **40,000 children** are diagnosed with a brain or spinal cord tumor every year,¹⁰ and Making Headway Foundation has directly contributed to a technology that could help every one of them. Since 1996, the Making Headway Foundation has been providing individualized care to children at the hospitals we work with, and now we are making a positive change **across the world**.



There is so much progress to celebrate, but there is still more research to be done. Your ongoing support for the Making Headway Foundation makes these breakthroughs possible. Thank you.

References

1. Savage N. Nature 2020;579:S14–S16.
2. Lyon JF, Vasudevaraja V, Mirchia K, et al. Acta Neuropathol Commun 2021;9:120.
3. Yang J, Wang Q, Zhang ZY, et al. Nat Commun 2022;13:4410.
4. Bleddea R, Vasudevaraja V, Patel S, et al. Sci Rep 2019;9:16830.
5. Suwala AK, Stichel D, Schrimpf D, et al. Acta Neuropathol 2021;142:179–189.
6. Tang K, Kurland D, Vasudevaraja V, et al. J Neuropathol Exp Neurol 2020;79:880–890.
7. Lee CH, Yu JR, Granat J, et al. Genes Dev 2019;33:1428–1440.
8. Capper D, Jones DTW, Sill M, et al. Nature 2018; 555: 469–474.
9. Paul Y, Mondal B, Vikas P, and Somasundaram K. Clin Epigenetics. 2017;9:32.
10. Fan Y, Zhang X, Gao C, et al. Arch Public Health 2022;80:209.

This document was developed by Costello Medical Consulting, Ltd. on a pro bono basis. For more information, please visit their website at costellomedical.com.



For the full reference list and more information, please scan the QR code