

# STATISTICAL SIGNIFICANCE

## THE BRAIN AS MEDIATOR

Medulloblastoma (MB) is the most common cancerous brain tumor in children. The SJMB03 trial <sup>a</sup> studied two different radiation therapy regimens (AR, HR <sup>b</sup>), along with chemotherapy and stem cell transplantation. Despite the the high survival rate, the radiation treatments can cause side effects, such as cognitive deficits. In particular, we found that patients treated with the more intensive HR regimen have worse cognitive development when compared to patients treated with the AR regimen. How exactly the HR treatment causes these cognitive deficits remains unknown. We wanted to open this black box by using a statistical tool called mediation analysis <sup>c</sup>. We looked at the “treatment → brain structure → cognitive development” pathway to determine to what extent the negative effects were exerted through the brain. We found that approximately 58% of the total negative effect was due to damage in certain brain regions <sup>d</sup>. This finding indicates that sparing these brain regions from irradiation or reducing their radiation dose will potentially benefit the patient by resulting in better cognitive development.

