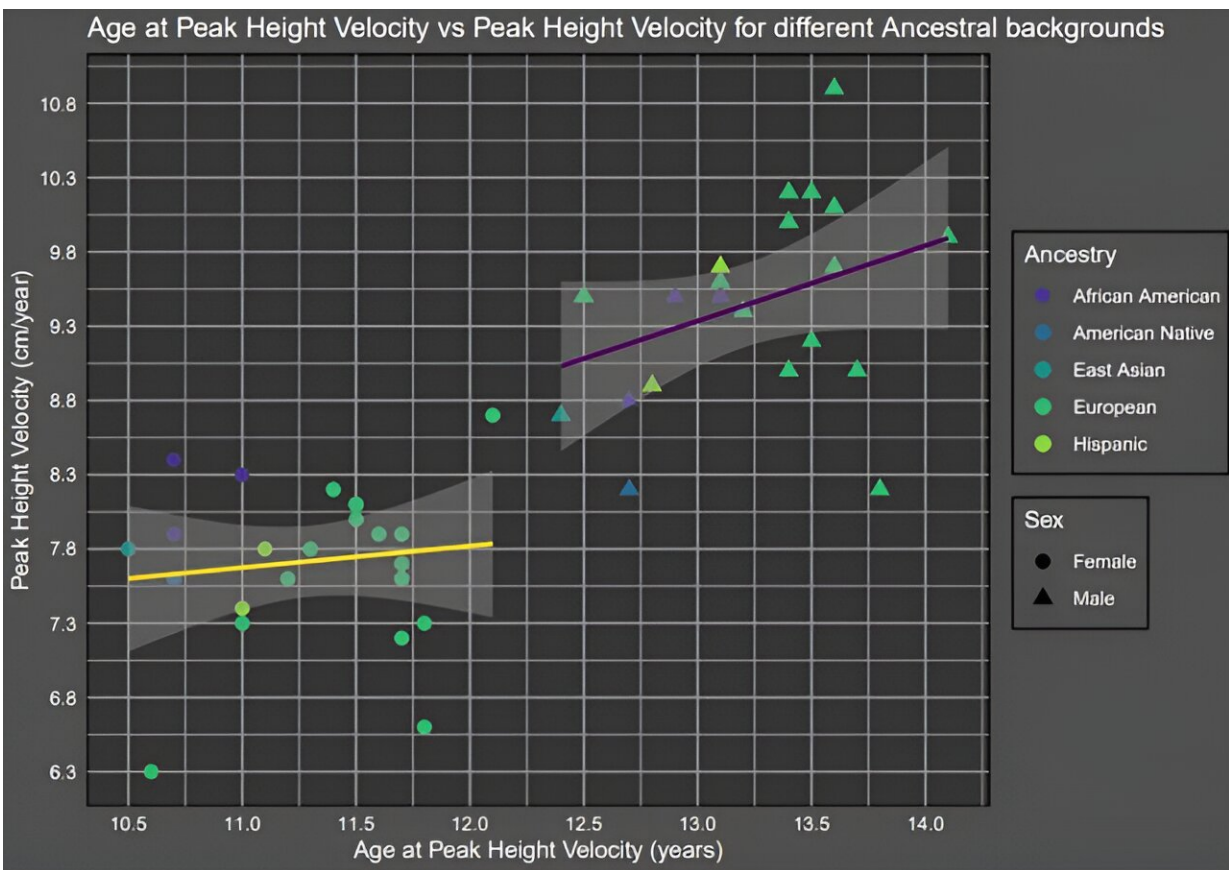


Study finds genetic link between growth during puberty and long-term health conditions

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Mean peak height velocity (cm/year) vs. mean age at peak height velocity (years) for cohorts of diverse ancestral backgrounds. Yellow and purple lines represent a linear model fit to $APHV \sim PHV \times sex$. Credit: *Genome Biology* (2024). DOI: 10.1186/s13059-023-03136-z

A genetic link between height growth during puberty and long-term health in adulthood has been identified by a [new study](#) from the University of Surrey and the University of Pennsylvania published in *Genome Biology*.

Researchers found that being taller early in puberty and growing quickly in height during this period is linked to a higher risk of atrial fibrillation later in life.

The research team investigated if genetics played a role in pubertal growth patterns and lifelong health conditions. Growth during this period can be hereditary, but the specific genetic factors underlying growth trajectories remain largely unknown.

To address this knowledge gap, researchers used a growth curve analysis on 56,000 people from diverse ancestral backgrounds containing their height measurements from five years old into adulthood. Such data gave researchers a comprehensive view of growth patterns across different populations and time periods.

Dr. Zhanna Balkhiyarova, co-author of the study and senior postdoctoral researcher from the University of Surrey, said, "Our study underscores the importance of large-scale genetic analyses in unraveling the complexities of human health. By using [big data](#), we reveal new insights into the [genetic factors](#) that affect growth during puberty and their long-term effects. With each discovery, we inch closer to medicine that addresses the unique needs of every individual."

Researchers identified 26 genes associated with various aspects of pubertal growth, including the scale, timing, and intensity of the growth spurt. Investigating further the lifelong impact of genetic variants associated with pubertal growth trajectories, researchers also analyzed genetic correlation and phenotypes (observable characteristics of an

individual) on data from the Penn Medicine Biobank and the UK Biobank.

Using this data, the team found, for the first time, the genetic relationships between pediatric height growth and a wide range of health outcomes across a person's lifespan.

Being taller at early puberty and experiencing quicker pubertal growth were associated with an increased risk of atrial fibrillation, an irregular and abnormally fast heart rate later in life.

They also found that individuals with a faster tempo of pubertal height growth have high levels of bone mineral density, higher levels of insulin resistance, and an increased risk of developing type 2 diabetes and lung cancer.

Dr. Anna Ulrich, formerly of the University of Surrey, said, "Our findings challenge the notion of a one-size-fits-all optimal growth pattern. Instead, they underscore the complex interplay between genetics and health, highlighting the importance of personalized approaches to health management."

Professor Inga Prokopenko, senior researcher of the study, Professor of e-One Health and Head of Statistical Multi-Omics at the University of Surrey, said, "This study represents a major step forward in understanding the genetic basis of pubertal growth and its far-reaching implications for lifelong health.

"As we unlock the secrets encoded in our DNA, we move closer to a future where tailored interventions based on individual genetic profiles revolutionize health care."

More information: Jonathan P. Bradfield et al, Trans-ancestral

genome-wide association study of longitudinal pubertal height growth and shared heritability with adult health outcomes, *Genome Biology* (2024). [DOI: 10.1186/s13059-023-03136-z](https://doi.org/10.1186/s13059-023-03136-z)

Provided by University of Surrey

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