5th International KAT6A and KAT6B Conference

Baltimore, USA | June, 2024

Summary

This report is designed for scientists, clinicians, and families with a child affected by KAT6A or KAT6B gene variations. Its purpose is to:

- **Summarize the scientific sessions**
- **Identify gaps and bottlenecks in current projects and outline the resources needed to address them**
- **Propose a strategy to generate these resources**
- **Outline the next steps to support the KAT6 Foundation's mission**

By addressing these points, we aim to advance understanding and support for individuals with KAT6A or KAT6B gene variations.

ABSTRACT

The KAT6 Foundation organized the **5th International KAT6A and KAT6B Conference,** a collaborative event centered around patients. The main objective was to strengthen international research on KAT6A and KAT6B and facilitate open discussions among families, clinicians, and researchers. The conference provided a platform for the KAT6 community to expand its network and establish connections among families and experts in the field. The event had 210 registrants, including 58 families and 20 scientists from the USA and around the world.

Held in Baltimore, USA, the one-day conference covered a wide range of topics, including personalized medicine, the role of iPSC cell lines, neuropsychological assessments, generation of accurate animal models to study KAT6 gene variations, advocacy, the KAT6A and KAT6B patient registry, and initiatives by the KAT6 Foundation, such as the KATwalk.

During the conference, the KAT6 Foundation assisted three research groups by facilitating family participation in research data collection. This year, the foundation also hosted three workshops for families on speech, advocacy, and a round table with Dr. Kelley. These workshops were highly praised for providing opportunities to learn and practice new skills and brainstorm various topics related to the health of children with KAT6A and KAT6B gene variations.

Scientific Sessions

Natacha Esber
Director of Science and Research
KAT6 Foundation

Jordan Muller
Chairperson
KAT6 Foundation Board

Dr. Natacha Esber, Director of Science and Research at the KAT6 Foundation opened the scientific session by highlighting the importance of studying KAT6A and KAT6B gene variations and driving therapeutics research to support children and families affected by these disorders.
Mr. Jordan Muller, Chairperson of the Board of the KAT6 Foundation, moderated the scientific presentations.

Scientific Sessions

Saylor Williams
Lab Manager, Serrano lab
Center for Regenerative Medicine
Boston University , USA

Introduction

The KAT6 Foundation is a strong advocate for patient-focused research. One of its key research initiatives is the establishment of an *induced pluripotent stem cells* (iPSCs) bank, led by researchers at the Serrano Lab at the Center for Regenerative Medicine, Boston University. At the annual meeting, Ms. Saylor Williams helped families understand iPSCs and their importance in creating optimal cell lines for KAT6A and KAT6B clinical and basic research. Three main questions were addressed: what are iPSCs, what is an iPSC bank, and how will this benefit researchers, patients, and families?

Induced Pluripotent Stem Cells (iPSCs)

iPSCs, derived from patient cells and reprogrammed to an embryonic-like state, can differentiate into various cell types. This process, which takes a few months, starts with collecting patient samples, particularly blood samples, to isolate peripheral blood mononuclear cells (PBMCs). These cells are cultured and reprogrammed into iPSCs, which undergo quality control to ensure successful reprogramming.

Purpose and Benefits of iPSC Banks

Williams explained that iPSCs allow the study of affected tissues that are otherwise difficult to access and offer a better model for human disorders compared to animal research. The iPSC bank, housed at the Center for Regenerative Medicine (CReM) at Boston University, is an open-access resource. This initiative aims to minimize the time researchers spend establishing cell lines by sharing these resources, thus accelerating research.

Research Collaboration and Development

The Serrano lab has been collaborating with the KAT6 Foundation to collect blood samples, and over the past year, they have reprogrammed these samples into iPSCs. The presentation summarized the progress in reprogramming samples for KAT6A and KAT6B and expressed gratitude to donors supporting the iPSC bank.

Scientific Sessions

Epigenetic Research and Techniques

KAT6A and KAT6B are epigenetic regulators that modify histones, affecting chromatin structure and gene expression. Williams described the lab's use of spectral flow cytometry, a technology that provides high-resolution analysis of histone marks. This technique allows the lab to study specific histone modifications and their impact on cellular functions.

Experimental Approach and Findings

Researchers at Serrano lab are working on differentiating iPSCs into neural progenitor cells (NPCs) and profiling these cells to identify histone marks and cellular activities. The goal is to determine if the cells are different, their functions, and confirm their identity. The protocol has improved sample throughput and the number of histone marks analysed. Preliminary data shows differences in histone acetylation levels between KAT6A mutant and control iPSC lines.

Future Directions

Williams emphasized the ongoing efforts to apply this protocol to various cell types to understand how KAT6A and KAT6B mutations affect different tissues. The ultimate aim is to correlate these findings with clinical manifestations of KAT6 syndromes.

Conclusion

The presentation concluded with a summary of the process of collecting patient samples, establishing the iPSC bank, and developing the spectral flow cytometry protocol. Williams reiterated the goal of understanding the epigenetic mechanisms underlying KAT6 syndromes and the importance of supporting KAT6A and KAT6B iPSCs research.

Scientific Sessions

Jacqueline Harris
Pediatric Neurologist

Jill Fahrner
Epigenetics researcher

Rowena Ng
Pediatric Neuropsychologist

Kennedy Krieger Institute & John Hopkins School of Medicine
Baltimore, USA

Overview and Objectives

Dr. Harris, Dr. Fahrner and Dr, Ng provided a comprehensive overview of KAT6A and KAT6B syndromes, focusing on their genetic and epigenetic aspects, clinical features, cognitive and behavioral phenotypes, and recent research findings. The primary objectives were to discuss these syndromes from both genetic and epigenetic perspectives, highlight Mendelian disorders of the epigenetic machinery (chromatinopathies), and examine the clinical and genetic manifestations of these disorders.

Genetic and Epigenetic Mechanisms

KAT6A and KAT6B are part of chromatinopathies, resulting from pathogenic variants in genes related to the epigenetic machinery. These genes function as writers, placing acetylation marks on histones, which in turn affect chromatin structure and gene expression. Both syndromes are autosomal dominant conditions typically associated with intellectual disability, growth abnormalities, and diverse manifestations.

Clinical Features

Common clinical features include intellectual disability, hypotonia, growth abnormalities, and various tissue-specific manifestations. KAT6A syndrome often presents with microcephaly, a thin or absent corpus callosum, and significant expressive language challenges. In contrast, KAT6B syndrome also shows similar features but with a higher incidence of agenesis of the corpus callosum.

Neurodevelopmental and Behavioral Aspects

Hypotonia is a nearly universal feature in both syndromes, and while seizures are more common than in the general population, they are not prevalent. Neurodevelopmental issues are primary concerns, with significant delays in motor skills, language, and cognitive functions.

Scientific Sessions

Cognitive and Behavioral Phenotype

KAT6A syndrome is associated with moderate to severe intellectual disability, with significant expressive language challenges. KAT6B syndrome exhibits similar cognitive impairments, though less detailed prospective data is available. Both syndromes display high variability in phenotypic presentation.

Recent Research Findings

Recent research involving 15 individuals with KAT6A syndrome and 9 with KAT6B disorder showed similar cognitive impairments in nonverbal reasoning and language comprehension. Executive functioning and daily life skills are significantly impacted in both groups. Elevated autism features and attention difficulties are common, with KAT6B showing slightly higher autism features.

Clinical Implications and Future Directions

Early and ongoing occupational and speech-language therapies are essential for individuals with both syndromes. Larger sample sizes and cross-disorder comparisons are needed to better understand genotype-phenotype correlations. Additionally, the development of adaptive neurocognitive tools for individuals with sensory differences is necessary.

Conclusion

The presentation highlighted the shared cognitive phenotype across KAT6A and KAT6B disorders and emphasized the need for targeted therapies and interventions to support affected individuals. Further research is essential to refine treatment approaches and improve outcomes for children with KAT6A and KAT6B gene variation

Scientific Sessions

Richard I Kelley
Pediatrician and Biochemical Geneticist
USA

Dr. Kelley delivered a comprehensive talk on the metabolic abnormalities associated with KAT6A and KAT6B syndromes, focusing on treatment strategies to correct abnormal metabolism. He emphasized the importance of understanding and treating these abnormalities to improve patient outcomes.

Metabolic Abnormalities and Treatment Strategies

Dr. Kelley identified several key metabolic abnormalities in KAT6A and KAT6B patients, including citric acid deficiency, which affects 95% of KAT6A patients and leads to intestinal dysmotility, and methionine deficiency, impacting protein synthesis and causing bone marrow failure in severe cases. Additionally, patients often have an increased need for certain vitamins (B5 and B6) due to metabolic disturbances. To address these issues, Dr. Kelley proposed several treatment strategies, such as using pantothenic acid and carnitine to stimulate acetyl-CoA production, aiding in histone acetylation, and using antioxidants to combat free radical damage in mitochondria. He stressed the importance of individualized treatment plans based on specific metabolic profiles, including amino acid abnormalities and citric acid cycle function.

Case Studies and Clinical Recommendations

Dr. Kelley shared insights from treating the first known patient with mitochondrial dysfunction prior to genetic diagnosis, highlighting the successful use of targeted metabolic treatments. He noted the variability among patients and the need for ongoing biochemical monitoring to tailor treatments. Dr. Kelley also discussed a subset of patients with gain of function mutations, characterized by higher citric acid levels and distinct biochemical profiles, emphasizing the importance of differentiating these cases for accurate diagnosis and treatment. He recommended routine metabolic testing for all children diagnosed with KAT6A or KAT6B to identify specific abnormalities and guide treatment, with ongoing assessment and adjustment based on individual metabolic responses and needs.

Conclusion

Dr. Kelley concluded by stressing the urgency of applying established metabolic treatments to manage KAT6A and KAT6B syndromes while awaiting the development of new therapeutic approaches.

Scientific Sessions

Paul Marcogliese
Biochemistry and Genetics Researcher
Rady College of Medicine
University of Mannitoba
Canada

Dr. Paul Marcogliese's presentation focused on leveraging fruit flies (Drosophila melanogaster) to investigate the functional impact of KAT6A and KAT6B gene variants, model disease symptoms, and screen potential therapeutic drugs.

Background and Importance

Fruit flies have been instrumental in genetic research for over a century, serving as models for understanding fundamental genetics, signaling pathways, and neurobiology. Recent advancements in gene editing, such as CRISPR, have enhanced their utility in precision medicine.

Research Goals

The research aimed to develop mutant fruit flies to model KAT6A and KAT6B gene variants, assess these genes' roles in fly development and adult brain function, and screen for drugs that can rescue phenotypic defects caused by gene mutations.

Findings

Key findings from mutant flies included the discovery that the fly homolog of KAT6A and KAT6B, called enoki mushroom (enok), is essential for viability. Homozygous loss of enok resulted in embryonic lethality, and knocking down enok in neurons during development or in adult flies led to severe phenotypic defects, including impaired climbing ability and reduced lifespan.

Drug Screening

Dr. Marcogliese reported on drug screening efforts, including testing miltefosine, which showed potential in increasing KAT6A and KAT6B expression in mouse models but failed to rescue the fly phenotypes. Future plans include testing other drugs, such as luteolin and N-acetylcysteine, in adult-specific phenotypes and seizure assays.

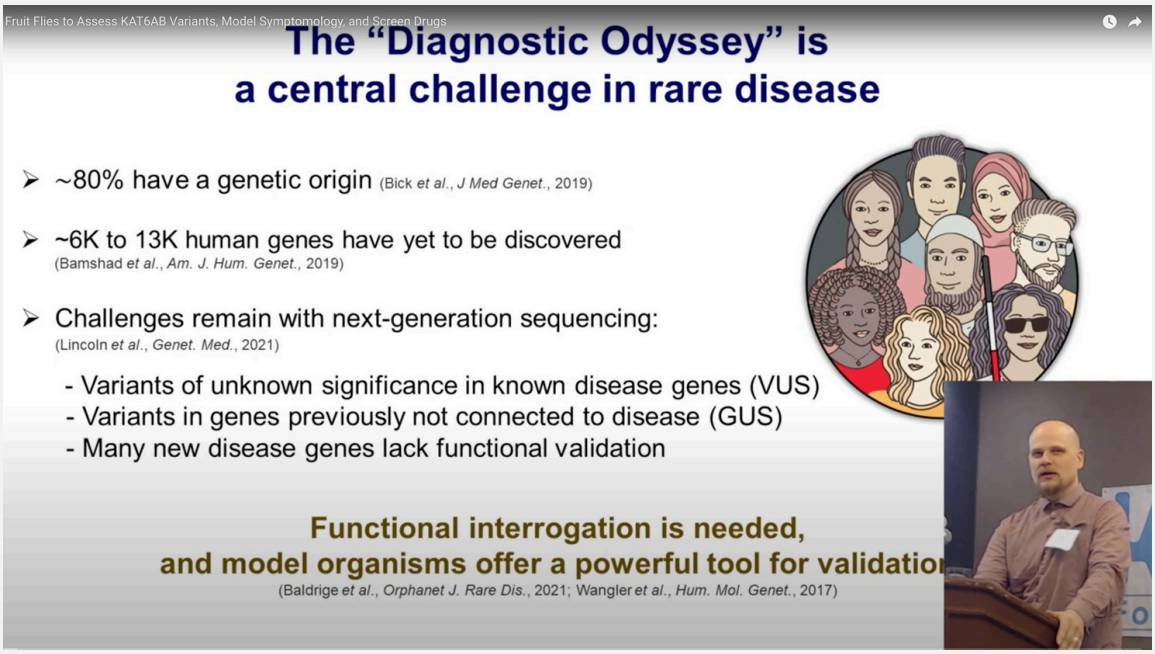
Scientific Sessions

Variant Assessment

The team created transgenic flies overexpressing human KAT6A and KAT6B variants. Overexpression of wild-type KAT6A or KAT6B often resulted in lethality, indicating the genes' dosage sensitivity. Different truncating and missense variants exhibited varying effects on viability and wing morphology, suggesting distinct functional impacts.

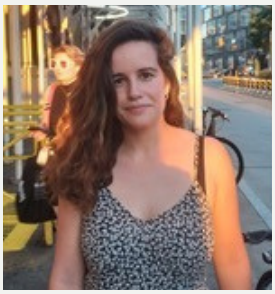
Future Directions

Preliminary data suggested a connection between KAT6A and Wnt signaling pathways. Future research will explore this relationship further, develop humanized fly models, and identify potential drugs for repurposing. Dr. Marcogliese highlighted the potential of using fruit flies as a cost-effective and efficient model for studying gene function, understanding disease mechanisms, and screening for therapeutic compounds.



Scientific Sessions

Alejandra Laguillo-Diego
Postdoctoral researcher
Apostolou Lab
Weill Cornell Medicine
New York, USA



Dr. Laguillo-Diego's presentation, titled "Dissecting the Role of Mitotic Histone Acetylation and Acetyltransferases in Epigenetic Inheritance of Stem Cell Identity," focused on chromatin cell fate decisions and the role of histone acetylation in maintaining stem cell identity. Her research initially centered on KAT6 proteins but later shifted to explore the significance of KAT7 and KAT6B proteins in this process.

Cell Identity and Chromatin

Embryonic and adult tissues constantly decide whether to renew or differentiate, which is crucial for tissue homeostasis and development. Despite cells having the same genome, cell identity is maintained through specific transcriptional programs and epigenetic layers of regulation, such as DNA and histone modifications.

Mitotic Challenges

During mitosis, chromatin compaction can disrupt cellular instructions, challenging cell identity. Certain proteins and histone modifications, like H3K27 acetylation, act as "bookmarks" to help cells retain their identity through mitotic divisions.

KAT6 Family Proteins

Dr. Laguillo-Diego's research found that KAT7 and KAT6B are retained on mitotic chromatin in stem cells and acetylate histone H3 at lysine 14 (H3K14ac). Histone proteomics showed significant retention of H3K14ac during mitosis.

Research Methods

Utilizing mouse embryonic stem cells and CRISPR technology, Dr. Laguillo-Diego generated cell lines with inducible degradation of KAT7 and KAT6B proteins, allowing temporal control over protein degradation, particularly during mitosis.

Scientific Sessions

Findings

The depletion of KAT7 and KAT6B during mitosis led to the loss of H3K14ac, affecting genes related to stem cell identity. Transcriptomic analysis revealed downregulation of pluripotency genes and upregulation of lineage-specific genes, indicating a shift in cell identity. Long-term loss of these proteins resulted in stem cells losing their self-renewal properties and differentiating.

Implications for KAT6 Syndromes

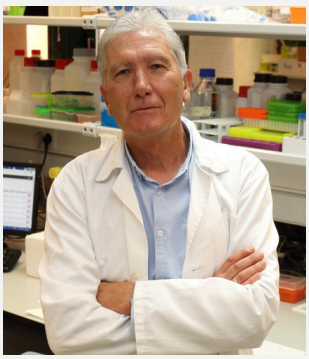
These findings suggest that haploinsufficiency in KAT6 syndromes may involve disrupted acetylation and transcription during mitosis, contributing to lineage infidelity. Understanding these mechanisms could inform therapeutic strategies targeting specific acetylation marks or genes affected by these proteins.

Future Directions

Dr. Laguillo-Diego plans to extend her research to human stem cells and specific differentiation programs, such as neuronal development. She is open to collaborations involving induced pluripotent stem (iPScs) cell lines to further investigate these processes in the context of KAT6 mutations.

Scientific Sessions

Jose A Sánchez-Alcázar
Molecular Biologist & Medical Genetics Researcher
Universidad Pablo de Olavide
de Sevilla, Spain



Introduction

Dr. Alcázar presented on the topic of precision medicine for KAT6A and KAT6B syndromes, highlighting the complexity of brain development and the numerous genetic causes that can lead to mental disorders. The presentation focused on epigenetics, particularly histone acetylation, and its impact on gene expression without altering the nucleotide sequence. Dr. Alcázar explained the roles of proteins like KAT6A and KAT6B in regulating histone acetylation and how mutations in these proteins can lead to various syndromes.

Histone Acetylation and Genetic Disorders

Histone acetylation is regulated by proteins like KAT6A and KAT6B, which are responsible for acetylating histones, and sirtuins, which deacetylate histones. Mutations in these proteins can lead to disorders such as KAT6A syndrome and KAT6B syndrome. These syndromes are characterized by developmental delays, intellectual disability, heart abnormalities, and other physical anomalies. Dr. Alcázar emphasized the importance of understanding these mutations and their impact on cellular processes, including gene expression and mitochondrial function.

Mitochondrial Dysfunction

Mitochondrial dysfunction is a significant aspect of KAT6A and KAT6B syndromes. Mutations in KAT6A and KAT6B can lead to oxidative stress and damage cellular components. The presentation discussed how mitochondrial dysfunction affects various cellular processes, including energy production, and highlighted the role of coenzyme A (CoA) in mitochondrial metabolism.

Scientific Sessions

Research Approach and Personalized Medicine

Dr. Alcázar's research approach involves using fibroblast cell cultures derived from patient skin biopsies. These fibroblasts can be reprogrammed into neurons to study the specific mutations and their effects. This personalized medicine approach allows researchers to test potential treatments on patient-specific cells. The presentation highlighted the use of sodium pantothenate and L-carnitine in rescuing cell death in patient-derived fibroblasts, showing promise for potential therapies.

Experimental Findings

The research found that patient-derived fibroblasts with KAT6A and KAT6B mutations showed deficiencies in various proteins related to histone acetylation, mitochondrial function, and antioxidant systems. Treatments with sodium pantothenate and L-carnitine were able to partially recover these deficiencies. Dr. Alcázar's team confirmed these findings using various assays, including western blotting, seahorse assays, and transcriptomic analysis.

Future Directions

The ongoing research aims to delve deeper into the mechanisms of these positive compounds, generate neuronal cells from patient fibroblasts, and confirm the results in these cells. The team also plans to explore the effects of lipid peroxidation and its impact on cellular functions in KAT6B syndrome. Dr. Alcázar emphasized the importance of personalized medicine in treating genetic disorders and the potential of their screening platform for identifying effective therapies.

Conclusion

Dr. Alcázar concluded by acknowledging the support from various funding sources and patient associations. He reiterated the commitment of his research group to investigating rare diseases and the importance of disseminating their findings to improve visibility and understanding of these conditions. For more information on Dr. Alcázar’s research and publication, visit the website at - https://sanchezalcazarlab.com/.

KAT6 Foundation Patient Registry

Emile Najm
Co-Founder & CEO
KAT6 Foundation

Bhawika Sharma Lamichhane
Postdoctoral Scholar
University of Utah, USA

The **KAT6A and KAT6B Patient Registry** team presented an overview of the KAT6A and KAT6B patient registry, which tracks patients with these genetic disorders.

The patient registry, launched in 2019 and hosted by the National Organization for Rare Disorders, is a secure, cloud-based platform compliant with US health privacy laws and FDA regulations. Since 2022, 60 patients have joined the registry. The registry aims to enhance understanding of KAT6-related disorders, disseminate information to researchers and clinicians, identify trends, guide the development of standard care, and expedite clinical trials.

There are 12 surveys within the registry, covering a range of topics from medical history to sociodemographic information. Participants are encouraged to have medical records, genetic diagnoses, and details on medications and therapies handy when filling out the surveys. Currently, 417 patients are registered, with 171 consented, 200 started surveys, and 186 completed surveys, representing a 44% completion rate. The goal is to increase this rate to 80-90%.

The presentation included data on the distribution of KAT6A and KAT6B cases worldwide, with 146 cases in the United States and varying numbers in other countries. Key findings from the registry data show that 40% of patients spent time in the NICU, 78% have global developmental delay, 19% are classified as autistic, and 80% have infectious diseases. The gender ratio is roughly equal.

To access de-identified data from the registry, researchers can email kat6aregistry@gmail.com and submit a data access request form. Future directions for the registry include publishing findings in scientific journals, studying autism spectrum disorder in KAT6 patients, and a mortality review committee to better understand the manifestations of KAT6 disorders.

KAT6A Foundation Fundraising committee

Karen Ginsburg
Chair, Fundraising Committee
KAT6 Foundation

Katie Bator
KAT6 Foundation

Ms. Karen Ginsburg and Ms. Katie Bator, both members of the KAT6 Fundraising Committee, have a long-standing association with the KAT6 Foundation as parents of children with a KAT6A gene variation. The dynamic duo presented on the fundraising initiatives for the KAT6 Foundation, highlighting two major annual events: the KATwalk and the Annual Appeal.

The KATwalk, held in September, can be organized as either a virtual or in-person event. Participants create web pages to share and raise funds. Last year's KATwalk surpassed its goal, raising nearly $200,000. To facilitate organizing the walk, a toolkit and support are provided.

The Annual Appeal, conducted around the holidays, involves reaching out to friends, family, and larger donors for contributions. Diane and John Jager were acknowledged for their generous three-year grant of $50,000 annually, which helped establish the appeal. To assist in this effort, social media posts and sample letters are provided, and the fundraising team is available to help approach potential donors.

In addition to these main events, individuals have raised $54,000 through personal fundraisers such as bowling parties, marathons, and special events like ice cream socials and golf tournaments. The foundation encourages creative fundraising efforts and supports participants with promotional materials and ideas.

KAT6A Foundation Fundraising committee

The foundation also participates in Giving Tuesday in November, contributing to a record fundraising total of $405,000 last year. The fundraising committee, entirely volunteer-led, invites more volunteers and co-chairs to join and help achieve and surpass these goals, emphasizing the importance of funding for research, family support, and advocacy.

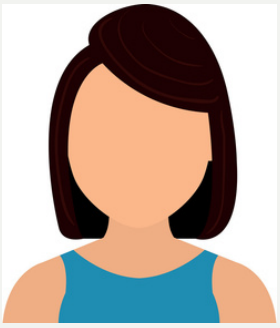
KAT walk 2022

KAT6A Foundation Advocacy workshop


Amy Young


Susan Hartung


Sue Carpenter


Beth Woodbury

The workshop led by the KAT6 Foundation advocacy team focused on sharing insights and experiences regarding the diagnosis and care of children with KAT6-related disorders. Speakers recounted personal experiences of their children being diagnosed with KAT6 disorders and highlighted the significant improvements in medical advice and resources over the years. Initially, there were limited resources, and advice often included institutional care, but this has improved with new laws and increased awareness.

The advocacy team emphasized the importance of learning about state-specific services and participating in legislative efforts. While federal laws protect the rights of people with disabilities, states have leeway in how they implement those rights and fund related services. It is essential to understand how your state supports individuals with disabilities. The “NORD State Report Card” evaluates how effectively states serve people with rare diseases and provides a useful tool to help advocate for necessary changes. It covers a range of critical topics such as Medicaid, newborn screening, protecting patients in state Medicaid programs, step therapy, and telehealth. Parents were encouraged to sign up for the NORD newsletter and bookmark their state’s representatives.

The advocacy team’s key legislative efforts in collaboration with NORD include:

- The Rare Act: Incentivizes research and development for rare diseases.
- Creating Hope Reauthorization Act: Enables rare pediatric disease priority review vouchers that reward companies for developing much-needed therapies for those impacted by rare diseases.
- The Accelerating Kids Access to Care Act: Helps ensure access to knowledgeable doctors for rare conditions.
- The Telehealth Modernization Act: Ensures the continuation of telehealth services post-COVID.

KAT6A Foundation Advocacy workshop

Families were encouraged to explore state-specific programs such as Medicaid, waivers, and self-directed services. Programs like the Katie Beckett Waiver and Family Supports Waiver assist families in managing costs and care at home, while self-directed services allow families to be paid caregivers, providing flexibility in care models.

The presentation highlighted the importance of a multidisciplinary medical approach for managing KAT6-related conditions. Common medical concerns include cardiology issues such as ASD, gastrointestinal problems like constipation and malabsorption, vision issues such as torticollis, infections and immunology concerns, sleep apnea requiring BiPAP machines, and the need for regular MRI evaluations and urologist consultations.

In the education sector, continuous advocacy was deemed essential. Parents were advised to push for more resources and support during IEP meetings and seek advocates or special needs attorneys when necessary. Planning for the transition to adulthood, including guardianship and long-term care plans, is crucial.

Financial and legal planning were also emphasized. Parents need to consider guardianship arrangements once the child turns 18, utilize ABLE accounts to save money without affecting Medicaid and SSI benefits, and write a detailed letter of intent to guide future caregivers.

The presentation acknowledged the importance of supporting siblings and recognizing their unique experiences. Programs like SibShops and Best Buddies provide support and networking opportunities for siblings. Ensuring siblings have special time and support to express their feelings is vital for maintaining a balanced family dynamic.

In closing, the foundation's board was commended for planning annual conferences and providing resources. Families were encouraged to connect and plan more frequent regional gatherings. The presentation ended with personal stories that highlighted positive relationships between siblings and underscored the importance of addressing their needs and concerns. Contact information and resources were provided for further support and networking opportunities.

KAT6A Foundation Advocacy workshop

Advice	Resources
Advice 1 - “Learn about your state”	NORD State Report Card
Advice 2 - “Sign up for the NORD Newsletter and Bookmark Your State Representative”	NORD Newsletter State Representative
Advice 3 - “Learn about waiver programs that reimburses expenses and can families be paid staff”	Kid Waiver programs - Katie Beckett Waiver Self-Directed Services
Advice 4 - “You probably know more about KAT6 than most doctors you work with”	KAT6 Handbook
Advice 5 - “Be an educational advocate”	Advocacy team presentation
Advice 6 - “It is never too early to plan for the future”	Advocacy team presentation
Advice 7 - “Remember KAT6 happened to your entire family”	Resources to help siblings - SibShops and Best Buddies
Advice 8 - More “Meet-Ups”	In person and virtual meetings hosted by KAT6 Foundation

KAT6 Foundation Family

Horses, Homeschooling and the Human Genome

Bethany Harris and her daughter Ireland Harris delivered a heartfelt presentation titled "Horses, Homeschooling, and the Human Genome." Bethany introduced their family from Maryland and highlighted Ireland's unique personality, humor, and linguistic quirks, which they fondly refer to as "Irelandisms." Ireland excels at snuggling, singing, and grammar despite facing daily challenges. The Harris family began homeschooling in 2019 to provide Ireland with personalized attention and accommodate her medical appointments. Ireland has developed a passion for subjects like the American Revolutionary War, music, dancing, and video games.

Therapeutic horseback riding has significantly benefited Ireland, improving her physical, mental, and emotional skills. Bethany shared Ireland's early medical challenges, including feeding issues, epilepsy, and delayed speech development. Despite extensive testing and specialist consultations, it wasn't until 2021, with whole exome sequencing, that they received a diagnosis of KAT6A syndrome. This diagnosis brought clarity and connection to the KAT6 Foundation, offering support from families worldwide.

Bethany emphasized the importance of empathy, patience, and advocacy in navigating Ireland's condition. She acknowledged the support of the KAT6 Foundation and the positive impact of attending conferences. The Harris family has formed lasting friendships within the community, finding strength and understanding. Bethany concluded by expressing gratitude for the foundation and the support they have received, highlighting the value of listening and community support in their journey.

“Freedoms of Speech” Workshop

Patricia Wilson
CCC-SLP, TSSLD
Otto Specht School

The "Freedoms of Speech" workshop was organized into several key sections, each addressing different aspects of speech and communication therapy through creative analogies.

I. **Communication:** This section covered the foundational principles of effective communication, setting the stage for the subsequent topics.

II. **Acrobatics Analysis:** Focused on individual abilities and presentations, this section explored the potential therapeutic approaches to improve communication skills, answering critical "why" and "how" questions.

III. **Juggling Programs:** Highlighted the importance of brain plasticity and the coordination of different systems necessary for effective communication.

IV. **Lion Taming:** Emphasized social and emotional regulation and activities designed to foster a growth mindset, reinforcing the belief "I am capable."

V. **Magical Acts:** Discussed systems integration, including sensory signs and communication developments that support brain changes, and motor planning for speech. This section analyzed various approaches such as PROMPT, ASL, and AAC.

The workshop provided a comprehensive overview of innovative techniques and strategies to enhance communication abilities in individuals, focusing on both the physiological and psychological aspects of speech therapy.

KAT6A Foundation's Next Steps

The KAT6 Foundation aims to continue supporting and empowering families with children affected by rare diseases. In terms of research, the foundation plans to fund more trials aimed at creating animal models to study KAT6A and KAT6B gene variations, as well as support additional clinical trials focused on treatment and drug efficacy. The foundation is committed to sustaining its initiatives, such as the KATwalk, the Empower grant, and the annual meeting, all of which are vital for raising funds and resources for the community. Additionally, the foundation seeks to build a strong advocacy team to further its mission and amplify its impact.

KAT6 Foundation

Thank you!