5th International Scientific Congress on Spinal Muscular Atrophy

BUDAPEST

11th — 14th March 2026

LAY SUMMARIES OF ORAL AND POSTER PRESENTATION ABSTRACTS

ORAL PRESENTATIONS

Session 1: Biomarkers in SMA

O1 - Defining and Refining Biomarkers in Spinal Muscular Atrophy

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We need better, objective tests to track how people with spinal muscular atrophy (SMA) respond to treatment. Simple blood tests could give objective, sensitive readouts over time. In research, objective, blood-based test are referred to as (molecular) biomarkers. One such biomarker, a protein called neurofilament light (NfL) looks promising in babies diagnosed through newborn screening but seems less helpful in older patients. My research aims to close this gap. By studying how patient cells make proteins, we found SMA-specific changes related to the function of the SMN protein that improve with the drug risdiplam. From this, we made a list of 12 proteins panel that predicts treatment response in cell and mouse models of SMA. In the future we will compare the amounts of these patients in SMA patient blood samples with motor tests and other clinical measures, aiming to improve biomarker availability for SMA research.

O2 - Muscle-specific extracellular vesicles: a novel biomarker for spinal muscular atrophy

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There is currently a real need to identify SMA biomarkers, which are biological molecules found in blood that give information on disease severity and response to treatment. Muscle releases biomarkers in the blood called muscle-specific extracellular vesicles (MuVs). We therefore studied MuVs released by SMA muscle with the ultimate aim of identifying a new and important biomarker that can be used by scientists and doctors that are developing new treatments and evaluating existing ones. Our results show that the characteristics of the MuVs released by SMA muscle are different than those released by healthy non-SMA muscle. Importantly, when treated with an approved SMA drug, the characteristics of the MuVs released by SMA muscle are returned to normal. Our study therefore identifies for the first time the potential ability for MuVs to be trustworthy biomarkers that can give information on disease severity and response to treatment in SMA.

O5 - Multi-omic biomarkers for personalized Spinal Muscular Atrophy management: A multicenter Italian study

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SMA is a genetic disease-causing progressive muscle weakness. Three medicines exist, but we cannot predict which patient responds best to which therapy.

Our Italian multicentre study searched for biomarkers in blood and spinal fluid to predict treatment response. We analysed proteins, lipids, and metabolites using advanced technologies and artificial intelligence.

We discovered molecules (like glutamine/glutamate ratio) that change with disease severity and normalize after treatment, especially in severe cases. Using lab models - "mini spinal cords" from patient cells and C. elegans worms - we confirmed findings.

AI identified three patient groups with different treatment responses. These biomarkers could help doctors choose the most effective therapy for each patient and monitor benefits objectively. This advances precision medicine, ensuring patients receive optimal treatment, improving outcomes, and quality of life.

O6 - Titin and the Muscle-Brain Axis in SMA: A promising biomarker for Nusinersen therapy across CSF transcriptome and radiological perspective

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SMA is a disease that weakens muscles, but treatments like Nusinersen are changing lives. While we know Nusinersen helps improve movement, we still don't fully understand its effects at a molecular level, especially in adults. Our study looked at the fluid surrounding the brain and spinal cord, called cerebrospinal fluid (CSF), in three adult SMA patients before and after they started Nusinersen. By analysing RNA in the CSF, we discovered how the treatment changes the body's processes over time. We found that Nusinersen significantly alters the "molecular signature" of the CSF, especially in genes related to muscle health. The levels of a specific muscle protein called Titin dropped as the treatment progressed, and this change was directly linked to improvements in the patients' motor skills. This research shows that SMA isn't just a motor neuron disease; it also involves muscle changes. Our findings suggest that Titin could be a new marker to track how well treatment is working.

Session 2: Regeneration and disease modifiers

O8 - Biomimetic Viscoelastic Hydrogels Promote motor neuron outgrowth and Modulate Astrocyte Behaviour for Spinal Muscular Atrophy Regeneration Applications

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While therapies targeting the genetic cause of SMA have shown improved outcomes for children, effective treatments for adults remain elusive, partly due to the need to regenerate lost neural tissue. Our research has developed a new, soft gel material that resembles the physical properties of the SMA spinal cord. Our developed hydrogel implant improves the growth and health of both healthy and SMA patient-derived motor neurons while promoting the ability of support cells known as astrocytes to provide neurotrophic support. Moreover, this soft hydrogel can support the local delivery of critical growth factors and cells, enhancing neurite outgrowth from dissected mouse spinal cords. By delivering neurons and helping them to survive, our hydrogel platform aims to offer new insights for improved neuronal replacement therapies and to enhance the quality of life for people living with SMA, addressing critical needs to develop regenerative focused therapies to restore motor neuron function.

O9 - Neuromuscular organoids reveal developmental transcriptomic dysregulation in SMA

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Spinal muscular atrophy (SMA) is a rare genetic disease that affects motor neurons and muscles, leading to muscle weakness and impaired movement. Animal models have provided insights into SMA, but they do not fully reflect human neuromuscular development. To overcome this, we used human stem cells to generate three-dimensional neuromuscular organoids containing motor neurons and muscle fibers. SMA organoids showed disrupted muscle organization and increased cell death, while neurons were less affected. Using advanced single-cell analyses, we identified over 1,500 genes with altered activity, affecting protein synthesis, neuronal development, and muscle cell adhesion. These organoids provide a powerful human model to study SMA mechanisms and may help guide the development of therapies to restore neuromuscular function.

O10 – A Novel Mouse Model of X-Linked Spinal Muscular Atrophy Offers a Platform for Preclinical Development of UBA1 Targeting Therapeutics

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Despite the stunning progress across SMA treatments in recent years, people with forms of SMA that are not associated with the SMN-gene have been left behind in research and treatment options. We have created a new mouse line which represents mutations in the UBA1-gene, which cause a form of the disease referred to as X-linked SMA and currently has no effective treatment options. To ensure that these mice reproduce the symptoms of X-linked SMA we have thoroughly investigated the features of their disease from the molecular, to cellular, to whole-animal level. Our work revealed that in mice, the UBA1 mutation causes muscle loss, reduced strength, and enacts changes in spinal motor neurons which may cause these symptoms. Matching these mouse features to human symptoms has enabled us to use this animal as the first mammalian model for X-linked SMA and begin preclinical testing of potential treatments for the disease.

O11 - Primary cortical neuron cultures as a novel reliable in vitro model to test treatment efficacy for spinal muscular atrophy

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For the first time, we applied an in vitro model of primary cortical neurons to study SMA pathology and to test new compounds, potentially targeting non SMN-dependent drugs.

Neuronal cells can be obtained from any murine model of SMA by dissociating and cultivating neurons from the cerebral cortex in vitro for up to 15-20 days.

We demonstrated that cortical neurons differentiate in vitro and develop features of neurodegeneration in the SMA condition compared to the wild-type one. In the longer time points, functionality of cultures could be recorded and measured (for example with multi-electrode arrays (MEAs) and whole-cell patch-clamp for electrophysiology techniques).

The model helps to understand novel mechanisms related to SMA pathology involving upper motor neurons and, as we demonstrated, it could serve as a read-out to test neuroprotection of novel compounds. Overall, primary cortical neurons could be useful for people living with SMA and the SMA community in the long term.

O12 - Significant microvascular pathology is driven by specific SMN depletion in endothelial cells: The 'EndoSMA' mouse

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Spinal muscular atrophy (SMA) is a disease that affects nerve cells controlling movement. People with SMA can also experience heart and blood vessel problems. These include poor circulation, finger, toe and skin necrosis. Even with treatment, these complications can persist. To study this further, we have created a new mouse model. In this model, the SMA gene defect is present only in the cells that line blood vessels (endothelial cells). These mice develop problems with the structure of their blood vessels. We showed this in the eyes and tail. This shows that loss of the SMA gene in blood vessels alone is enough to cause vascular damage. SMA may directly affect blood vessels, not only motor neurons. By uncovering this hidden side of SMA, we hope to open new paths for therapies. These will target blood vessels and aim to increase quality of life for people living with SMA.

Session 3: Metabolism and diet in SMA

O13 - Mitochondrial dysfunction in Spinal Muscular Atrophy: emerging insights from disease mechanisms to therapeutic targets

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Spinal muscular atrophy (SMA) is a severe genetic disease and the leading inherited cause of infant mortality. Although recent gene therapies have significantly improved outcomes, they are not curative. Many patients continue to experience symptoms, revealing the limitations of treatments that primarily target motor neurons. SMA is now recognized as a multisystemic disease: the SMN protein is active in all cells, and its loss affects multiple organs in ways that are not yet fully understood. Our research investigates how mitochondrial dysfunction, affecting cellular energy, calcium balance, and metabolism, contributes to SMA. Using motor neurons derived from SMA patient stem cells, we identified key mitochondrial abnormalities and widespread metabolic disruptions. We also discovered specific microRNAs that may drive these defects. These findings support a mitochondria-centred model of SMA and pave the way for new therapies designed to complement existing gene-based approaches.

O16 - Mitochondrial and Redox Perturbations in SMA: Insights from Multi-Organ Omics and Therapeutic Targeting of the NRF2-KEAP1 Axis

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Current SMA therapies improve outcomes but are not a cure, and some patients do not respond. To understand why, we studied how SMA affects organs beyond the nervous system, focusing on energy and antioxidant (redox) balance. Using a mouse model, we analysed seven organs and found that SMA disrupts energy production and antioxidant defences in different ways depending on the tissue. In the liver, some antioxidant pathways improved with therapy, but heme production enzymes stayed impaired. In the kidney, we discovered for the first time a disruption in communication between mitochondria and the endoplasmic reticulum, which was fully corrected by treatment. To see if similar processes occur in humans, we tested skin cells from SMA patients and found that activating the NRF2 antioxidant pathway improved survival and protected against stress. These findings suggest that combining current therapies with drugs that support antioxidant defences may benefit patients who do not fully respond.

Session 4: Sensorimotor function and fatiguability in SMA

O18 - Sensory-motor neuronal dysfunction: an essential pathomechanism in animal models and patients of SMA

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SMA is a disease where motor neurons are lost and muscles atrophy. However, points of contact (synapses) between sensory fibers and motor neurons is an early pathological event and showed that sensory synapses are dysfunctioning in both SMA mice and patients. To study whether there is an imbalance between activation (excitation) and silencing (inhibition) of neurons – which does not occur in healthy people - we discovered that neuronal networks in SMA fail to compensate when there is a reduction in excitation and instead, they remain silent. This failure of neurons to adapt, results in motor neurons not being able to contract muscles properly, resulting in movement difficulties. The significance of this, is highlighted by our work with Dr Capogrosso (Univ. Pittsburgh), where we showed that spinal cord stimulation (SCS) - which activates neuronal networks - improved motor function in SMA patients. We hope that SCS can be a novel therapy in combination with approved SMA therapies.

O19 - Cortical GABAergic dysregulation and metabolic alterations in a Spinal Muscular Atrophy mouse model

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SMA is usually known as a disease that mainly affects the motor neurons in the spinal cord and brainstem, but emerging evidence suggests that involvement of the brain motor cortex may contribute to disease progression. In a severe SMA mouse model, we found that loss of the SMN protein changes how brain circuits work by reducing key inhibitory neurons and impairing communication with supporting cells called astrocytes. This creates an imbalance in GABA, the brain's main inhibitory neurotransmitter, weakening brain networks and affecting the excitatory/inhibitory signalling equilibrium. Our findings point to a broader role of SMN in maintaining balanced brain communication and open the door to new therapies that also target the brain cortex to improve motor control.

O20 - Advancing assessment of perceived physical fatigability using the SMA EFFORT

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SMN targeted therapies have improved outcomes in SMA but many still face challenges with fatigability that limits independence. Measuring this experience has been difficult as current tools do not capture the real-world impact of fatigability in SMA. To address this, we developed the SMA EFFORT, a patient-reported scale designed for SMA that anchors physical activity to intensity and duration. In this study, 121 people with SMA ages 12-78 completed the scale. Results showed that fatigability was present across all levels of function but varied based on specific types of activity for the individual. Greater fatigability was reported by participants on risdiplam compared to nusinersen, but differences between treatment groups disappeared once key health factors were considered, suggesting similar benefit. This work highlights the ongoing need for treatment strategies beyond current therapies and shows how the SMA EFFORT can guide research and care to better support improved outcomes.

O21 - smn-1 regulates motoneurons and dopaminergic neurons crosstalk in C. elegans

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We used C. elegans as a simple animal model to elucidate the role of Smn1 in dopaminergic neurons. This is important since SMA has been re-defined as a disorder affecting also different neurons, other than motor neurons. We generated a C. elegans SMA model that, thanks to many experimental advantages, allowed us to deeply study dopaminergic neuron function when Smn1 is absent, in a whole living animal. We found a reduction of dopamine content and defects of dopaminergic neuron functionality, demonstrating an alteration in this pathway. Interestingly, we also demonstrated that the modulation of dopaminergic neurons rescued the neurodegeneration of motoneurons suggesting that the two classes of neurons influence each other. Since dopaminergic neurons are involved in cognitive functions, mood regulation, motivation and reward, sleep, heart rate, kidney function, lactation, and blood vessel function, our results can help understand the biological basis of these alterations in SMA.

O22 - Motor neuron pathology drives spinal circuit defects and phenotype of spinal muscular atrophy with respiratory distress type 1

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Spinal Muscular Atrophy with Respiratory Distress Type 1 (SMARD1) is a rare genetic disease that causes breathing difficulties, muscle weakness, and early death in children. It is caused by mutations in the IGHMBP2 gene, but how the disease damages the nervous system was not well understood. In a mouse model of SMARD1, we found that muscle connections are lost before motor neurons die and that key communication networks in the spinal cord progressively break down, impairing movement control. Remarkably, restoring the mutated gene only in motor neurons prevented muscle wasting, repaired spinal circuits, and restored motor function in mice. We also detected similar changes in spinal cord tissue from a SMARD1 patient, confirming the relevance of our findings. This study shows that motor neurons are the main drivers of SMARD1 and highlights them as a critical target for developing future therapies.

Session 5: Optimising treatments for SMA

O24 - Rescuing translation defects as a new SMN-independent therapeutic strategy for Spinal Muscular Atrophy

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Spinal Muscular Atrophy (SMA) is a devastating disease caused by mutations in the SMN1 gene, which lower the levels of the SMN protein and lead to motor neuron loss and muscle wasting. Although three therapies for SMA have been approved, they do not represent a definite cure for the disease, highlighting the urgent need for complementary treatments. In our study, we tested more than 100 compounds and identified several candidates that correct SMA-associated defects in cellular models of SMA. Interestingly, the most promising compound protects motor neurons from degeneration and extends survival in animal models of SMA. These results reveal a promising strategy that could work alongside existing therapies to enhance patient care and quality of life.

O25 - Respiratory function in adults with Spinal Muscular Atrophy type 1 and 2 treated with risdiplam

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Despite treatment, respiratory problems still contribute to morbidity in patients with SMA. Research on the effects of treatment on respiratory function is scarce, particularly in adults. To date, this is the largest study on the effect of risdiplam on respiratory function in adults. In many countries, treatment is still not, or only partially reimbursed for adults due to limited evidence of efficacy. Our study demonstrates that respiratory muscle strength improves during risdiplam treatment. Enhanced respiratory muscle strength may translate into improved cough strength and fewer lower respiratory tract infections, thereby potentially breaking the vicious cycle of lung function decline and contributing to a better quality of life for patients. Importantly, these findings provide evidence that may help inform healthcare professionals and strengthen the case for broader treatment access in adults.

Session 6: New standards of care for SMA

O30 - Ensuring best hip management in individuals with SMA across the UK

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In 2018, international care guidelines for SMA were published, before treatments became available that are now helping people live longer and healthier lives. The original guidelines focused mainly on children and gave little attention to hip health.

People with SMA, especially those who do not walk, are at high risk of hip instability, subluxation and dislocation due to muscle weakness, reduced movement, contractures and scoliosis. These problems can cause pain, difficulties with seating and reduced quality of life, making hip management a key concern. Good hip care can help reduce pain, improve comfort, support independence and make everyday activities easier.

SMA Care UK, a collaboration of healthcare professionals and people living with SMA, is developing new guidance to improve hip care. This guidance will cover how hips are checked, monitored and treated. It will be reviewed by expert bodies to ensure it is approved, widely used in practice and supported by future research.

O31 - Immune and hematopoietic defects in SMA are rescued by SMN repletion

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Increasing evidence demonstrates that spinal muscular atrophy (SMA) extends beyond neuromuscular pathology. In this study, we investigated how SMA affects the immune system.

In a severe SMA mouse model, we found marked alterations in the thymus, spleen, and bone marrow. These include structural abnormalities, disrupted immune cell development, and signs of inflammation. Importantly, restoring SMN levels in these tissues with a nusinersen-like therapy not only improved survival and motor function but also prevented these immune defects.

Analysis of patient samples supported these findings, revealing similar changes in the spleen. Further studies are needed to measure inflammatory markers and analyse immune cells from patients to better connect human data with results from animal models.

Overall, our work shows that SMA impacts the immune system, which may alter how patients respond to infections or treatments. This highlights the immune system as a new potential target for SMA therapies.

O33 - Elective Preterm Birth as a Strategy for Early Intervention in Spinal Muscular Atrophy with Two SMN2 Copies

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Spinal muscular atrophy can now be effectively treated if therapy starts very early, but uncertainty remains when a foetus has only two SMN2 copies. Neurodegeneration may already begin before birth, and while in utero treatment is being explored, it raises risks and ethical questions. In this case, doctors and parents chose a different approach: a planned preterm caesarean at 35 weeks so treatment could begin almost immediately after birth. The baby received risdiplam on day 2, followed by gene therapy at day 59. Apart from brief breathing support, the newborn recovered well. Neurofilament markers stayed mostly stable, and motor development normalized by five months. This case shows that planned early delivery with prompt treatment may be a practical alternative to prenatal therapy, offering a way to prevent early damage in high-risk infants. More cases are needed to confirm the safety and long-term benefits of this strategy.

Session 7: Cognitive function in SMA

O35 - Cognitive development in children with 5q-SMA identified by neonatal screening – 4 years follow-up

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Children with spinal muscular atrophy (SMA) and only two copies of the SMN2 gene show signs of impaired cognitive development, even when treatment begins early in infancy. In this study, 22 children aged four and older, identified through newborn screening, were assessed. The results showed that while their overall IQ was in the average range, several areas—such as language comprehension, processing speed, and general cognitive abilities—were below average. In contrast, visual-spatial skills and working memory were within the normal range. Parents did not report any significant behavioral problems. Early developmental test scores were strongly linked to later IQ.

O36 - Cerebellar pathology contributes to motor and cognitive deficits in spinal muscular atrophy

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Spinal muscular atrophy (SMA) is known as a disease that causes muscle weakness because motor neurons in the spinal cord degenerate. However, this study shows that SMA also affects the brain, specifically the cerebellum, which organizes movement. In both severe SMA mice and Type I patients, Purkinje cells (PCs) gradually die, and their input connections weaken, reducing the cerebellum's ability to control movement. This damage arises independently from the spinal cord and directly contributes to motor problems. When the SMA-related protein was reduced only in PCs, animals later showed severe movement problems, but also displayed early cognitive deficits, such as reduced social communication, which improved when the protein was restored in PCs. Current SMA therapies, including gene therapy and splicing drugs, partly helped but did not fully protect the cerebellum. These findings highlight cerebellar damage as an overlooked contributor to SMA symptoms and a target for future treatments.

O37 - SMACK! Project: Impact of the parent-child interaction in the early neurodevelopmental stages of a cohort of children with SMA diagnosed by neonatal screening – a pilot study

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Spinal muscular atrophy (SMA) is a rare genetic disorder that affects motor neurons, resulting in muscle weakness. New treatments and newborn screening have transformed its outlook, allowing children to be diagnosed and treated before symptoms appear. However, little is known about how these medical advances influence early parent-infant interactions and family well-being. This pilot study compared infants with SMA diagnosed through screening to typically developing peers during the first year of life. Researchers observed play sessions, early communication, and social responses, while also gathering parents' views on the diagnosis and medical care. Early findings provided a significant insight into the parent-child dynamics within families of children living with SMA. Besides, we described how the experience of receiving a diagnosis and ongoing medicalization can affect these dynamics, even when children develop similarly to their peers. These results underscore the importance of incorporating psychosocial and relational support into SMA care, benefiting both children's development and family life.

Late Breaking News Session

O38 - Salanersen, A Novel Antisense Oligonucleotide for Spinal Muscular Atrophy: Phase 1 Interim Safety and Exploratory Efficacy Results and Phase 3 Study Designs

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Spinal muscular atrophy (SMA) is a genetic condition that causes muscle weakness. Salanersen is an experimental medicine designed to increase levels of a protein needed for nerve and muscle health. Salanersen is injected into the spinal fluid once per year.

This Phase 1 study tested salanersen in gene therapy-treated infants and children with SMA who had ongoing unmet needs. Participants received either 40 or 80 milligrams of salanersen and were assessed for safety and early signs of benefit, including improved movement.

Salanersen was generally well tolerated. High levels of nerve damage markers reduced by 70% after starting treatment and stayed low over time. After one year, half of the participants achieved new movement milestones, with improvements in overall ability.

Early results suggest salanersen may be tolerable and could improve nerve health and movement in infants and children with SMA. Three Phase 3 studies are now examining salanersen in different groups of people with SMA.

O39 - Treating spinal muscular atrophy mice and worms with melatonin leads to improved disease phenotypes

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Metabolic organs such as muscle, liver, pancreas and fat are also impacted in SMA. They control important functions in the body, including how we store and use energy and how our body's clock responds to light and darkness. Metabolic issues are often still present in people living with SMA, even after treatment with a disease-modifying therapy. We recently identified that melatonin, a molecule produced by the body to control the body's clock, has the potential to improve metabolic issues in SMA. We therefore treated SMA worms and mice with melatonin and observed that this improved various SMA symptoms, including survival and metabolic issues. Our findings therefore support metabolism as an important treatment target for SMA and melatonin as a potential additional treatment option to complement the benefits of the currently approved disease-modifying therapies.

O41 - Prenatal exposure to risdiplam during pregnancy postpones disease onset in a severe SMA mouse model

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Strong research studies show that starting treatment early helps people with Spinal Muscular Atrophy (SMA) achieve better outcomes. However, even when treatment begins soon after birth, it does not cure the disease. In the most severe forms of SMA, the condition begins before the baby is born as there is an important period when the motor neurons especially need the SMN protein to work properly. Risdiplam is a medicine given by mouth that helps the body make more of the SMN protein, therefore giving risdiplam to a pregnant mother might be a way to help treat babies with SMA before birth. We gave a risdiplam-like compound to a pregnant mouse with SMA affected foetuses. Giving the medicine to the pregnant mum made the pups with SMA move better and live longer. Treatment helped keep their muscles healthy and fixed some of the connections between nerves and muscles. Our work suggests that the best results for treating SMA will come from giving treatment both before and after birth.

POSTER PRESENTATIONS

P118 - A translation-based biomarker panel to predict disease progression and treatment response in spinal muscular atrophy

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Spinal muscular atrophy (SMA) is a genetic disease that causes muscle weakness and can be life-threatening. Current treatments boost levels of the SMN protein, but patients respond differently, and doctors cannot always predict how severe the disease will be or how well therapy will work. To address this, we studied how SMN affects the process of making proteins in cells. Using patient skin cells and mouse models, we identified six proteins whose levels change with disease progression and treatment. Four of these consistently reflected disease status and response to therapy in patient-derived skin cells grown in the lab. One protein also predicted how strongly cells would respond to treatment. Our results suggest that measuring these proteins could help monitor SMA, guide treatment decisions, and improve patient care.

P120 - Muscle fiber conduction velocity in the upper arm during low- and high-intensity contractions is lower in patients with SMA than in healthy controls

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Muscles contain two fiber types: type I (used for endurance) and type II (used for strength and speed). In SMA, type II fibers are more affected, leaving relatively more type I fibers. This imbalance may alter how their muscles function during various tasks. In this study, we compared the muscle performance of patients with SMA to that of healthy individuals. Participants were asked to contract their biceps muscles at different levels of strength. We measured strength, endurance, and how fast muscle signals traveled through the muscle fibers. People with SMA had weaker biceps but could keep the contraction just as long as healthy people. Their muscle signals propagated more slowly, especially at higher effort. This suggests they use more type I fibers than healthy people. Although we are still studying more participants, these first results may help design therapies and rehabilitation that focus on strengthening the muscles.

P115 - CSF biomarkers show blood-spinal cord barrier dysfunction in treated Type 3 SMA patients

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Spinal muscular atrophy (SMA) is a motor neuron disease that also affects other parts of the body, including blood vessels. Blood vessels in the spinal cord are vital for motor neuron support and protection. They form a barrier to keep harmful substances in the blood away from motor neurons. Our previous research shows that this barrier is damaged in untreated SMA patients. This allows toxic proteins to leak into the spinal cord, which may worsen motor neuron loss.

To determine if this damage persists following treatment, we studied spinal fluid from Nusinersen treated SMA patients and healthy samples. We found higher levels of blood proteins in spinal fluid from SMA patients. We also found changes in molecules that control blood vessel health and repair. These results suggest that this protective barrier remains disrupted despite treatment.

As current therapies may not prevent this long-term damage, new approaches to protect or repair blood vessels could improve outcomes for patients.

P123 - A High-Throughput Microfluidic MEA Platform to Model SMA-Specific Neuromuscular Junctions and Identify Electrophysiological Biomarkers

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Spinal Muscular Atrophy (SMA) is a neurodegenerative disease that presents with varying severity and currently lacks a curative treatment. To better understand the disease's heterogeneity and to help in the discovery of new treatments, we developed a platform that mimics the connection between nerves and muscles using cells from patients. This new tool allows us to study how affected cells communicate by sensing their electrical activity and analysing it with advanced data analysis techniques. The platform also enables testing of new drugs to assess whether they can restore healthy cell function or not. Ultimately, our goal is to accelerate drug discovery by providing pharmaceutical researchers with a reliable system to evaluate treatment efficacy across different SMA subtypes, helping bring more effective therapies to SMA patients.

P028 - Effects of spinal stabilisation surgery on motor function in SMA patients receiving disease-modifying therapy

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We examined 11 children with spinal muscular atrophy receiving disease-modifying therapy (DMT) to evaluate motor changes after spinal stabilisation surgery. Hovewer all children motor scores improved or stabilized after initiaton of DMT, at the first postoperative follow-up 7 of 8 children showed worse HFMSE scores (mean –8.9 points). After one year 4 of 6 remained below their pre-operative level, while 2 improved (mean change -4.2). In the RULM test 6 of 7 assessed children declined initially (mean –3.4), and after a year 4 still scored lower, while 2 regained their baseline (mean change -1.3). Two children tested with CHOP-INTEND had persistent deterioration. One child who could walk with a frame before surgery showed a 6-minute walk test decrease from 71 m to 35 m within a year. Although spinal surgery is often necessary to stabilise the spine, our data indicate that a marked drop in motor performance is common after the operation and may persist long-term in many patients.

P030 - Fibro-Adipogenic Progenitor cells from murine SMA muscles are intrinsically adipogenic which is normalized by Risdiplam

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Muscles in people with SMA bear the consequences of increased fat and scar tissue buildup that competes with building functional muscle. In this study, we sought to determine if the cells that make the fat and scar tissue, called FAPs, were affected by mutations causing SMA. We used mice that have mild SMA symptoms to examine FAPs isolated from adult muscle, and found that they made more fat than those from control mice. Treating the cells with Risdiplam, which boosts Smn levels in the cells, caused the SMA FAPs to behave more like control FAPs. It is promising that an approved treatment can reduce fat production by SMA FAP, and paves the way for this therapy to provide more benefit to people with SMA.

Session 1: Sensorimotor function and fatiguability in SMA

P009 - Clinical outcomes of TheraBite treatment in patients living with Spinal Muscular Atrophy type 2 & 3

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Spinal Muscular Atrophy (SMA) Types 2 & 3 frequently cause reduced active maximal mouth opening (AMMO) through progressive weakness and contracture of the chewing muscles. This restriction impacts nutritional intake, oral hygiene, dental care delivery and emergency airway management during medical procedures. There are no existing evidence-based therapies for the treatment of AMMO.

We trialled a jaw stretching device (Therabite) to establish how effective it is at increasing AMMO in people who have SMA.

All completing patients achieved between a 1 and 8mm increase in AMMO, representing 5-42% percentage improvement. Patient-reported benefits included improved oral hygiene access (n=9), reduced mealtime duration (n=1), increased bite capacity (n=3), improved secretion control (n=1), and reduced gastrostomy dependence through improved oral intake (n=1).

Our findings indicate that Therabite treatment improves AMMO and functional outcomes in selected patients with SMA.

P011 - An Attempt at Integration of SMA Assessment: Exploring Clinical and Electrophysiological Perspectives

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The advent of DMTs has changed SMA, exposing the limits of standard motor scales, which fail to capture subtle qualitative changes, fasciculations, tremor, fatigue, and perceived gains in autonomy. We explored whether additional tools may complement existing measures.

Eleven patients underwent three serial ECGs. Fasciculation number declined significantly only at the last ECG, while amplitude decreased earlier and remained lower; changes were independent of type, sex, or SMN2.

Clinical notes of 146 “improvement events” on the same patients were categorized into Features and Domains. Notes most often reported improvements in autonomy, strength, endurance, and balance, with SMA2 patients showing axial/postural gains and SMA3 gait/upper-limb improvements; endurance dominated early visits, autonomy later.

These exploratory findings suggest that ECG and systematic clinical analysis may capture changes not reflected by motor scales, supporting a multidimensional framework for SMA assessment.

P013 - Design and Preliminary Validation of a Clinical Outcome Measure for SMA Patients. SMA-LIFE ML43472 STUDY

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The advent of new treatments for spinal muscular atrophy (SMA) has underscored the need to assess aspects of the disease that are not measured by conventional motor scales, while also revealing the limited sensitivity of current tools to detect subtle but meaningful changes over time.

To address this gap, we developed and validated SMA Life, a new clinical tool designed collaboratively by clinicians and patients in Spain. SMA Life evaluates multiple dimensions (bulbar, motor, respiratory, and fatigability) using both questionnaires and clinical measures.

Session 2: Sensorimotor function and fatiguability in SMA

P012 - Goals and therapeutic expectations of British and Italian adult SMA patients in the era of disease modifying therapies. Comparative study using goal attainment scale (GAS)

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We studied adults with spinal muscular atrophy (SMA) at two centers in Europe (Milan and Sheffield) from 2019 to 2025. Fifty-eight patients set personal goals to improve areas important to them, such as arm strength, independence, and fatigue. More patients in the UK achieved their goals (67%) compared to Italy (16%). Overall, 60% improved, 29% stayed the same, and 10% worsened. The Goal Attainment Scale (GAS) helped measure progress based on what matters most to patients, capturing benefits that usual tests might miss. This approach supports personalized care and better reflects patients' real-life experiences living with SMA.

P015 - Management of Bulbar Function Impairment in Spinal Muscular Atrophy from a Multidisciplinary Perspective in Spain

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Bulbar dysfunction is a common and clinically significant complication in spinal muscular atrophy (SMA), as it negatively affects patients' quality of life and overall health. Its systematic assessment is limited due to the lack of standardized evaluation tools. Addressing this gap is essential to improve care. This study explores the current approaches to managing bulbar dysfunction in individuals with SMA in Spain. A non-interventional, cross-sectional pilot study was conducted including healthcare professionals (HCPs) with expertise in SMA across Spain. Participants were invited to the study by the national SMA registry CuidAME. HCPs working in centers with a multidisciplinary team more frequently used instrumental assessment of bulbar function and were more likely to recommend bulbar rehabilitation. While demonstrating a strong clinical commitment, the study highlights a critical need to standardize assessment protocols to ensure optimal and equitable care for all patients with SMA.

P017 - Muscle Function and Physical Activity in Children with Spinal Muscular Atrophy: A Cross-Sectional Case-Control Study

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Spinal muscular atrophy (SMA) is a severe neuromuscular disorder. Disease-modifying therapies (DMTs) have dramatically improved the disease burden. However, despite treatment, many children still experience muscle weakness, deformities, fatigue, and reduced physical capacity. A deeper understanding of musculoskeletal function is crucial to unravel the pathophysiology and better understand functional outcomes

This study aims to systematically evaluate muscle strength, neuromuscular control, muscular morphology, and physical activity in children with SMA.

In this cross-sectional study, case-control study, each SMA patient will be with healthy controls. Assessments include muscle activity, muscle strength, muscle morphology, joint mobility, and physical activity.

Outcomes will be compared with controls and analysed across sub-groups.

This study will clarify key determinants of muscle function in SMA in the DMT era, by linking physiology and activity to morphology and function.

P033 - Divergent therapeutic effects of risdiplam and AAV9-SMN on cerebellar pathology in severe spinal muscular atrophy

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Spinal muscular atrophy (SMA) is a childhood disease that causes muscle weakness and paralysis due to loss of motor neurons. New treatments extend survival but often only partly improve movement. Our study shows this may be because SMA also affects brain circuits beyond the spinal cord. We focused on the cerebellum, a brain region important for movement and coordination, and found it is severely underdeveloped in a mouse model of SMA. Key nerve cells in the cerebellum, called Purkinje cells, were malformed and worked poorly, reducing the brain output needed for motor control. We then tested two therapies: risdiplam and gene replacement using AAV9-SMN. Risdiplam improved survival, motor performance, and cerebellar pathology, while AAV9-SMN extended survival but did not restore cerebellar function, resulting in persistent motor impairment. These findings reveal cerebellar damage is a core feature of SMA that must be effectively targeted by therapies to fully improve motor function.

P047 - Early Motor and Musculoskeletal Outcomes of Presymptomatic SMA Infants Treated with Gene Therapy in Sweden

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Spinal muscular atrophy (SMA) is a severe inherited disease that affects the nerves controlling muscles. Without treatment, babies with SMA often lose muscle strength quickly. In 2023, Sweden started newborn screening for SMA, making it possible to find and treat affected infants before symptoms appear. In this study, Swedish infants diagnosed through screening received gene therapy early in life. First results show that these children are developing motor skills such as movement and posture close to what is expected for their age, and so far they have very few complications. This is the first Swedish report of such early treatment, and it suggests that acting before symptoms start can help children with SMA grow stronger and avoid many physical problems later in life. Continued follow-up will show how well these children develop over time.

P049 - Motor function changes in SMA type 1 and 2 during risdiplam treatment

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While SMN2 splicing modifiers (nusinersen and risdiplam) have shown to be effective in infants, children and young adults with SMA, efficacy has not been investigated in severely affected adult patients. Treatment evaluation of risdiplam is particularly relevant for this population, as risdiplam is often the only treatment option due to reimbursement restrictions (for example, age or weight) or disease severity (for example, limited access because of severe scoliosis or scoliosis surgery). We treated 76 treatment-naïve patients (median age 27; range 11-52 years) with SMA type 1 and 2 with risdiplam. After 36 months, 90% of patients reported improvement or stability of motor function, which was confirmed in 60% with improved or stabilized motor function scores. This study shows that during risdiplam treatment, motor function scores change differently compared to the natural disease course in adults with SMA types 1 and 2, even in severely affected patients.

P55 - Successful Management of SMA Type 1 with Gene Therapy and Rescue Nusinersen Following a Severe Adverse Event

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Objective: To report a successful case of SMA type 1 treated with gene therapy, followed by nusinersen as a rescue treatment during critical deterioration.

Methods: A 1.5-month-old infant with SMA 1, received gene therapy at 2 months. One month later, she developed sepsis and severe respiratory distress, requiring intubation. Nusinersen was initiated as a rescue measure for more immediate SMN protein enhancement. She was extubated one week later and completed four doses of nusinersen.

Conclusion: The patient showed significant clinical improvement. Four months post-nusinersen, her CHOP INTEND score improved from 9/64 to 27/64, and she regained oral feeding. This case suggests that in SMA patients with severe acute functional deterioration after gene therapy, additional SMN-enhancing therapies should be considered.

P061 - Embryo-targeted risdiplam therapy: effects of prenantal-only exposure to SMN-dependent therapy in a mouse model of SMA

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Early treatment for Spinal Muscular Atrophy (SMA) leads to better outcomes, with the greatest benefits in patients treated as soon as possible. Yet, post-birth therapy does not cure the disease, in fact, severe type 0 patients develop problems before birth. Risdiplam, an oral drug that increases SMN protein, can reach the foetus when given to the mother. This method could increase SMN protein before birth, meaning the early death of motor neurons and muscle could be stopped. In our study on SMA mice, giving risdiplam to the pregnant mum was enough to improve weight, motor neuron and muscle health as well as lifespan. Our treated SMA mice were lively, moving freely and looked healthy. Our next steps will focus on the brain and the connections between the nerves and muscles. Overall, early therapy in the foetus can push back motor neuron and muscle problems, but ongoing treatment after the baby is born is likely needed for best results to stop disease.

P63 - A novel therapeutic candidate for Spinal Muscular Atrophy identified through drug repositioning: evidence from a mouse model and patient-derived cells

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Current treatments for SMA patients have greatly improved outcomes in particular when early administered, but new approaches are still needed. In our research, we tested an FDA-approved drug already used for other diseases, and found that it can boost SMN protein production. In SMA mouse models, GT5 extended survival, improved movement, protected motor neurons, reduced neuroinflammation, and preserved muscle innervation. We confirmed these benefits also in human SMA cell models, where GT5 improved motor neuron survival. Because GT5 can reach the nervous system and is already in clinical use for other conditions, it shows strong potential to be repurposed as a new therapy for SMA.

P065 - Goal Attainment Scaling (GAS): a patient-centred outcome in SMA

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It is a challenge to capture clinically meaningful intervention effects in (rare) diseases is challenging due to the heterogeneity between patients, small sample sizes, and the lack of knowledge on the minimal important change (MIC) of traditional functional scales. Goal Attainment Scaling (GAS) is a patient-centred tool assessing individualized goal achievement on a five-point scale ranging from -2 (much less than expected) to +2 (much more than expected). GAS is highly appreciated in clinical care, but its suitability as an endpoint in clinical trials has not yet been established. The primary aim of this study is to evaluate the reliability, validity and responsiveness of GAS in patients with SMA and other neuromuscular diseases. Our second aim is to develop an international training program for GAS evaluators based on review findings, expert opinion and panel discussions, which is required for standardized use and to enhance practical implementation.

P73 - High-frequency rTMS targeting lower motoneuron circuits in SMA: interim safety, tolerability and efficacy results from STIM-SMA

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Spinal muscular atrophy (SMA) is a rare disease where the nerves that control muscles do not work well, causing weakness and trouble moving. Not everyone can get current medicines, and these medicines do not always give full improvement. This study tested a new, safe way to stimulate the brain with magnetic pulses (HF-rTMS) to see if it can help people with SMA move better.

Nine young people, aged 12–24, took part in two weeks of treatment. It was safe, with no serious side effects. Most felt stronger and had small improvements in muscle function. These early results show this brain stimulation method could be helpful for people with SMA, but more research is needed to know who can benefit most.

P075 - Innovating respiratory care for children with SMA: improving effectiveness and compliance of respiratory muscle training through gaming

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Children with SMA often have weakened breathing muscles, which can lead to fatigue, morning headaches, and a higher risk of lung infections. Respiratory muscle training (RMT) can help to improve breathing and reduce infections, however, it also represents yet another routine in a packed agenda. Our study introduces a game-based app that transforms RMT into a fun, interactive experience. With live feedback, streaks, and rewards, the app motivates children to train regularly while giving clinicians useful insights. By making therapy enjoyable, we hope to boost long-term engagement and improve health outcomes. Starting in 2026, our clinical trial will assess both the physical benefits and how well children can maintain this playful approach at home. This research could lead to stronger breathing, fewer hospital visits, and a more positive therapy experience for children living with SMA.

P77 - Study protocol for the MAGNITUDE study: A randomized controlled trial to investigate the effects of personalized progressive resistance training in patients with SMA and CM

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This study investigates if a personalized strength training program can help people with neuromuscular diseases to improve muscle function and activity and participation levels.

In SMA personalized progressive resistance training (PRT) might optimize the effects of drug treatment.

We have developed a strength training program, which focuses on personalized exercises based on individual treatment goals. All participants will follow a supervised program with 4 to 5 different strength exercises for 14 weeks, 3 times a week. A total of 54 participants between 10 and 50 years old in the Netherlands will take part. They are randomly assigned to either a group that starts the training right away or a group that begins later. The main goal is to determine whether muscle strength in the elbow flexors improves compared to usual care. We will also study effects on daily activities, muscle and nerve function, metabolism, and participants' own experiences.

P79 - Active NBS: A Fully Remote, Multicenter Initiative for Longitudinal Motor Monitoring in Infants with SMA Identified by Newborn Screening

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Spinal muscular atrophy (SMA) is a rare disease that weakens muscles from an early age. Newborn screening now allows babies to be diagnosed and treated quickly, which has transformed their outlook. But some children, especially those with only two SMN2 gene copies, may still show early signs of the disease, and it is not yet clear how their motor development evolves in the long term or when to start new treatments. The Active NBS study was created to answer these questions. It follows children from 4 months of age using wearable technologies that can be used at home: the MAIJU suit, which tracks movement until a child starts walking, and Syde® sensors, which then record walking patterns. This fully remote design reduces the burden on families and allows participation across countries. The study aims to better understand motor development in SMA, validate new digital tools, and guide the timing of future therapies to improve outcomes for all children.

P85 - Motor Function Improvement with Nusinersen in SMA: Insights from a Functional Status–Stratified Meta-Analysis

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Spinal muscular atrophy (SMA) causes progressive muscle weakness. Nusinersen is a treatment that can improve strength and function, but people with SMA have very different levels of ability, so it is likely that they may also respond differently to treatment. In our study, we reviewed all available research that reported results separately for people who can walk, those who can sit but not walk, and those who cannot sit on their own. We found that most patients improved during the first year of treatment: walkers could walk farther, and sitters gained strength in both gross and upper-limb abilities. Improvements after the second year were smaller, but most patients remained stable, which is important because SMA usually worsens without treatment. These findings help set realistic expectations for patients and families and support early and continuous treatment.

P87 - A Dosage Study for AAV9-Mediated Gene Therapy and the Development of a CRISPR Based Combinatorial Therapy for the Treatment of Spinal Muscular Atrophy

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While current therapies are able to successfully increase SMN protein levels, some patients with SMA respond well to therapy while others do not. Even for those who respond well, treatment is only partially curative, and for this reason research must continue to explore new therapies and new combinations of therapies.

To explore the effects of new and combined treatment, our lab has treated a mouse model using a low dose of SMN1 gene replacement therapy. In characterizing this model, we have shown that motor neurons respond well to therapy, whereas muscle tissue is less receptive. Using our model, we are exploring the effect of combining SMN1 gene replacement therapy with a new gene editing tool. This gene editing tool targets the SMN2 gene and increases its production of SMN protein. Currently, we are measuring if this combination of therapies improves the health of motor neurons and increases muscle function in our mice.

P89 - An update on MAP the SMA: a Machine-learning based Algorithm to Predict THErapeutic response in SMA

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We developed MAP the SMA, an AI tool that predicts how SMA patients will respond to treatment. The system analyzes key patient information including age, SMA type, genetic details, breathing support and motor test scores. Our tool can forecast individual outcomes at the next clinical visit using all available prior data and provide a long-term forecast. The latent model identified three distinct profiles of disease progression.

This will allow clinicians to determine early on which group a patient belongs to, enabling personalized care plans. The model will also be validated against patient-reported outcome measures (PROMs) to ensure it captures what matters most to patients. By providing actionable insights, it helps doctors make better treatment decisions, gives families realistic expectations, and assists researchers in designing improved clinical trials.

P91 - Long-term efficacy and safety of Risdiplam in adults with 5q spinal muscular atrophy (SMA): a large prospective multi-centre observational study

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We studied 268 UK adults with SMA taking Risdiplam, an oral medicine that can slow or stop SMA progression. This is the longest real-world study to date, following a large cohort of patients for up to 42 months through the Adult SMAREACH UK network. Participants averaged 35 years old, ranging from 16-81. Most had Type 2 or 3 SMA and 88% permanently used wheelchairs. We measured motor function, breathing, and quality of life every 6 months. Results showed many patients improved their motor function scores compared to baseline, while others remained stable. These benefits continued throughout the 42-month study with no new safety concerns. Our study provides strong evidence that Risdiplam helps adults with SMA maintain or improve their abilities long-term in real-world settings. For the SMA community, this means having substantial evidence to support and counsel patients on well-tolerated treatments that keeps working over years, offering hope that progression can be slowed or stopped.

P036 - Regulation of the ceramide pathway as a modulator of SMN in Spinal Muscular Atrophy cellular models

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Aberrant ceramide accumulation and signalling have been implicated in numerous neurodegenerative diseases as Amyotrophic Lateral Sclerosis, Parkinson's disease, Alzheimer's disease, and Niemann–Pick disease, where contribute to lysosomal and mitochondrial dysfunction, oxidative stress, and apoptosis. This link highlights the role of sphingolipid metabolism in motoneuron vulnerability.

In our work, we analysed the expression of key enzymes in the ceramide pathway in SMA cellular models: human fibroblasts, human motoneurons differentiated from iPSCs, SMNDelta7 primary motoneurons cultures. We observed significant alterations in the sphingomyelin phosphodiesterase 1 (SMPD1-encoded enzyme) protein levels in SMA motoneurons, suggesting that ceramide metabolism may be dysregulated in these cells. The modulation of these enzymes may open new opportunities for therapeutic strategies aimed at restoring lipid balance and preserving neuronal function.

P040 - Identification of new SMN-independent small molecules through an in vivo semi-automated drug screening platform

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To improve patients' quality of life we need to combine current therapies with new treatments that work in an SMN-independent manner. For this purpose, we used an alternative animal model, named C. elegans, which led to important discoveries awarded with four Nobel prizes. We generated a C. elegans SMA model that, thanks to its size (1 mm), rapid life cycle (3 days), few neurons (302) and transparency, allowed us to see the 19 motoneurons dying when Smn1 is absent in a whole living animal. Using an automated system, we tested 4487 FDA-approved compounds and identified 19 new small molecules that counteract neuron degeneration. We deeply characterized the 2 most promising compounds, investigated how they work and confirmed their efficacy in a mammalian model. This work demonstrates the high potential of combining C. elegans with large-scale drug testing to uncover new neuroprotective molecules to be combined with existing treatments to better preserve SMA patients' health.

P048 - Protocol of a population-based open-label cohort study to evaluate clinical efficacy of intrathecal nusinersen in older children, adolescents, and adults with SMA

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Nusinersen (Spinraza) was the first approved disease-modifying therapy for SMA in the Netherlands. Treatment was reimbursement for children aged <9.5years and younger, but reimbursement in patients starting after 9.5 years of age was only granted under conditional reimbursement between 2020-2026. We present the study design for this conditional reimbursement.

All symptomatic patients with SMN1-related-SMA aged 9.5 years and older, an estimated 290 patients, were eligible for screening to start treatment. Patients receive nusinersen according to standard schedule for at least 48 months. During the study period, patients and their treating physicians are blinded to test results. We will perform systematic evaluation of motor function, fatigability and quality of life using multiple outcome measures, and monitor long-term safety and tolerability. In addition, results will determine reimbursement conditions of nusinersen for patients with SMA aged 9.5 years and older in the Netherlands.

P50 - Parenthood, family planning, and pregnancy experience and outcomes in patients with Spinal Muscular Atrophy

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This study aims to expand limited knowledge on pregnancy and outcomes in patients with 5q-SMA (Spinal Muscular Atrophy). The project is divided into two parts: a gender-specific survey in Germany/Austria (Part 1) and a similar data collection across multiple European countries (Part 2). Researchers will analyse how perspectives on parenthood and reproductive attitudes vary by patient characteristics (e.g., SMA type, therapy, gender). A key focus is on elucidating the frequency and nature of potential complications during pregnancy/delivery, the neurological and psychological aspects of parenthood, and the influence of pregnancy on SMA severity in both female and male patients. Data is gathered via a project-specific online questionnaire from national registry patients. The insights will contribute to developing evidence-based recommendations for counseling SMA patients regarding pregnancy and childbirth, ultimately improving their care and quality of life.

P62 - Early SMN-boosting improves the effects on motor function of Spinal Muscular Atrophy therapy

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Spinal Muscular Atrophy (SMA) is caused by deletions or mutations in the SMN1 gene leading to insufficient SMN protein expression. However, the severity of the disease is sharply modulated by the presence of different copies of its homologous SMN2, thus showing how any rise in SMN expression can be highly beneficial. This evidence drove the development of three effective drugs to raise SMN levels. However, they exhibit high costs, side effects, and they increase SMN expression with some latency from administration. To fill this gap, we developed TAT-flSMN, a "ready-to-use" recombinant protein consisting of a cell-permeable peptidic moiety fused to the native human SMN sequence. Notably, the administration of TAT-flSMN to cellular and animal models of SMA can ameliorate their phenotype alone or in combination with a Nusinersen-like antisense nucleotide. Overall, we provide proof-of-principle evidence that TAT-flSMN can be a valuable add-on to the existing therapeutic portfolio for SMA.

P076 - Virtual targeted rehabilitation for patients with Spinal Muscular Atrophy: Phase 1: Proof-of-concept (VRehab-SMA project)

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The Spinal muscular atrophy revised Standard of Care guidelines highlighted the need of a proactive physiotherapy approach. In a UK national survey (2022) reported access to physiotherapy was ranked as limited, with 64% seeing a physiotherapist once a year.

To support people living with SMA, clinicians (STRONG) and engineers from the University of Oxford seek to develop a virtual rehabilitation technology that provides individualized exercise programs for people living with SMA without the need for transfers, enabling safe and independent use.

VRehab SMA will use a multi-phase development strategy to create a person centric gamified rehabilitation experience for all SMA phenotypes. Our hope is the create long-term change in how physiotherapy can be provided remotely, enjoyable and safely, with a view to integrate into clinical practice. Additionally, we plan to explore VRehab as a motor function outcome measure in the context of clinical trials to reduce the burden on participants.

P080 - Newborn Screening for SMA in Serbia: Expert Committee–Led Personalized Treatment and Real-World Challenges After Two Years of Implementation

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Serbia introduced nationwide newborn screening for spinal muscular atrophy (SMA) in 2023, making early detection and treatment possible for every baby. In the first two years, over 120,000 newborns were screened, and 19 babies were diagnosed with SMA. Thanks to early testing, most began treatment before six weeks of age, giving them the best chance to grow up without symptoms. A unique feature of the Serbian program is the National Expert SMA Committee, which carefully reviews every case and ensures that each child receives the most appropriate therapy, balancing medical evidence with practical realities and making the best use of limited resources. The program has faced challenges, such as logistical issues, treatment rules, and family engagement, but it shows how screening, expert teamwork, and community support can work together to save lives and give children with SMA a healthier future.

P88 - Anesthetic risks during intrathecal nusinersen admission in children with Spinal Muscular Atrophy type1

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Children with SMA treated with nusinersen undergo general anesthesia every four months. Because this is repeated so often, anesthesia is sometimes seen as routine, and its potential risks may be underestimated. For children with severe breathing and swallowing problems, anesthesia is never without risk. Current literature provides limited data on the risks of anesthesia for nusinersen administration. With alternative treatment options available, it is increasingly important to weigh the risks and benefits of each. Our study addresses this by evaluating the frequency of respiratory complications during anesthesia in children with SMA type 1. Together with our ongoing research for patients with SMA type 2 and 3, these findings aim to support healthcare professionals, patients and families in making more informed decisions and preparing for possible risks during treatment. Our goal is to ensure that every patient receives the safest and most appropriate treatment option.

P96 - SMA Care UK: optimising bone health for individuals with SMA across the UK

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In 2018, international care guidelines for spinal muscular atrophy (SMA) were published. Since then, new treatments have become available that are helping people with SMA live longer and healthier lives. However, the original guidelines focused mainly on children and gave little attention to bone health. We now know that people with SMA are more likely to have weak bones, osteoporosis and fractures because of reduced movement, muscle weakness and other factors. These problems can cause pain, limit independence and affect everyday activities, so looking after bone health is important for quality of life.

SMA Care UK, a partnership of healthcare professionals, people with SMA, and families, is developing new guidance on bone health. This will set out how to check, monitor and treat bone problems in both children and adults. The guidance will be reviewed by expert organisations to make sure it is approved and widely used, with further research continuing to fill the gaps.

P098 - SMA Care UK: a national initiative to ensure that those living with SMA receive the best possible care

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In 2018, international care guidelines for spinal muscular atrophy (SMA) were published. Since then, new treatments have become available that are helping people with SMA live longer and healthier lives. However, the original guidelines focused mainly on children and gave little attention to bone health. We now know that people with SMA are more likely to have weak bones, osteoporosis and fractures because of reduced movement, muscle weakness and other factors. These problems can cause pain, limit independence and affect everyday activities, so looking after bone health is important for quality of life.

SMA Care UK, a partnership of healthcare professionals, people with SMA, and families, is developing new guidance on bone health. This will set out how to check, monitor and treat bone problems in both children and adults. The guidance will be reviewed by expert organisations to make sure it is approved and widely used, with further research continuing to fill the gaps.

P100 - SMA Care UK: ensuring the best management of spine for individuals with SMA across the UK

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Spinal muscular atrophy (SMA) is a genetic condition that causes muscle weakness over time. The last international care guidelines were published in 2018, before treatments became available. These treatments have changed what SMA looks like and how it progresses, but the old guidelines focused mainly on children and no longer reflect current needs.

SMA Care UK is a partnership of people with SMA, families, caregivers and healthcare professionals working to update care standards in the UK. One priority is spinal care, as back and spine problems are common and can impact comfort, function and quality of life. Experts have reviewed the latest evidence and real-life experiences to create new guidance covering both surgical and non-surgical options for children and adults. This work is important for people living with SMA because it ensures care is based on the best evidence, reduces variation across services and helps people with SMA access the right treatment and support throughout life.

P106 - Consensus Statement on Management of Hip Displacement in Spinal muscular atrophy in the Disease Modifying Therapies Era

M. Vanegas[1], G. Baranello[2], F. Norman-Taylor[2], M. Kokkinakis[1]; UK Delphi consensus collaborators

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Spinal muscular atrophy (SMA) is a genetic neuromuscular disorder caused by SMN1 variants, with Type 1 being the most severe. New therapies (nusinersen, risdiplam, onasemnogene abeparvovec) improve survival and motor outcomes but raise new challenges. Hip displacement management remains controversial, ranging from conservative to surgical approaches. A UK Delphi consensus involving 45 experts from 19 paediatric neuromuscular centers, plus family input, produced national guidance. Across two rounds, 13 statements were approved, emphasizing individualized, multidisciplinary care, proactive prevention of hip dislocation in children with higher motor potential, radiographic surveillance, and approaches to painful hips and contractures. The group highlighted the need for long-term data and evidence-based guidelines that include less invasive options. This consensus provides the first UK and international guidance to standardize care and promote further research.

P108 - A new hip x-ray protocol to guide referral and management of hip displacement in SMA: The "Evelina view"

M. Kokkinakis[1,2], F. Alshenaiber[2], J. Sheehan[2], A. Schofield[2], T. Vampertzis[2], G. Baranello[3], M. Vanegas[1,2]

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This study examines the management of hip displacement (HD) in children with SMA, focusing on the role of hip surveillance (HS). While hip monitoring is standard for children with cerebral palsy (CP), its application to SMA is unclear. Hip clinical examination alone is not sufficient or reliable to establish HD diagnosis and guide appropriate management.

We propose a new radiographic view, the "Evelina view," to better assess HD in SMA patients, considering the high proximal femoral anteversion (distorted hip anatomy) seen in this cohort. When applied to 17 patients, the proposed radiographic HS protocol showed lower HD rates compared to the standard "CP x-ray view", preventing unnecessary surgeries and enabling more accurate treatment decisions. The study suggests adopting HS in SMA care to guide both conservative and surgical interventions, calling for a dedicated radiographic protocol to improve diagnosis and treatment pathways.

P110 - Longitudinal course of joint range of motion in children with spinal muscular atrophy receiving disease-modifying agents

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Imagine you are 12 years old and have SMA, for which you are receiving treatment. Your muscle strength is improving, but due to knee contractures, you cannot stand.

This study aims to support care strategies focused on maintaining joint mobility and preventing contracture development in children with SMA treated with disease-modifying therapies. Over a period of three years, we monitored knee/elbow/wrist joint range of motion changes over time. We included children with SMA (with 2 or 3 SMN2 copies) who started treatment within the first 18 months of life. We analysed 165 visits of 39 children (median age 22 months). Showing an average yearly decline in knee extension of 3˚. The overall course of range of motion for elbow and wrist remained stable. This study provides a first step toward understanding how joint range of motion changes over time. Our findings represent an initial step toward developing future individual prognostic models for contracture development in children with SMA.

P097 - SMA Care UK: ensuring the best respiratory care for individuals with SMA across the UK

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The 2018 SMA care guidelines were written before treatments that can change the course of the condition were available and focused mainly on children and based on motor milestones like walking or sitting.

SMA Care UK brings together healthcare professionals and people with SMA to update these guidelines to reflect new treatments and changing needs. The new draft guidance focuses on breathing care for both children and adults, including emergencies and surgery and is based on individual symptoms. This is important for patients because it ensures care is personalised, safer and easier for non-specialist doctors to follow, helping people with SMA live healthier lives and receive the right support when they need it.

P099 - SMA Care UK: ensuring the best transition from paediatric to adult care for individuals with SMA across the UK

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The 2018 SMA care guidelines were written before new treatments became available and focused mainly on children. Today, people with SMA are living longer, with new and changing needs that were not covered in the original guidance. One key gap is support for the move from children to adult services. Without proper planning, this transition can be fragmented, leading to missed care and reduced quality of life.

SMA Care UK is bringing together people with SMA, families and healthcare professionals to create new guidance that ensures care is continuous, personalised and responsive to both medical and everyday needs throughout life. This is important for patients because it helps avoid gaps in support, improves independence and wellbeing and ensures everyone has access to the right care at the right time.

P101 - Exploring the lived experience of young adults living with Spinal Muscular Atrophy (SMA) transitioning from paediatric to adult services in the United Kingdom

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The aim of this research is to gain a better understanding of the process of moving from paediatric to adult care (known as transition) for young adults living with SMA in South London and surrounding areas. Little is known about the lived experience of transition in this group of people, however, research conducted in parts of America suggest that improving communication between teams and providing age-appropriate information and resources would be beneficial. Previous research also suggests that mental health can be problematic at this time. A survey will be sent out to young adults living with SMA who attend St George's Hospital in South London to gather their views. A small focus group to further explore their experience will also be conducted. The results will be used to help develop the service offered to young adults to ensure it meets their needs and improves the process of transition.

P107 - “From Caregiver to Playmate”: a Parent Training Model for treated Children with Spinal Muscular Atrophy

M. Rauso, E. Pagliaccia, M. Negri, C. Mastella, M. Foà, M. Antonella Costantino

Sapre- UONPIA Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico

Parents of children with SMA often find it difficult to engage in play that is not focused solely on rehabilitation. Yet, play is essential for children's emotional, social, and cognitive development.Our program,“From Caregiver to Playmate,” was created to empower parents and strengthen the parent–child bond through play. A multidisciplinary team guided families with counseling sessions, practical tools, and dedicated resources, helping them integrate play into daily life. Sixteen parents participated in the study, and results showed that children maintained or improved adaptive skills, while parents became more confident and engaged in their role as playmates. The program also supported children's communication and relationships, reducing risks of developmental difficulties. Although the sample was small, findings highlight the importance of family-centred, play-based care as part of SMA management. Group play activities are now being explored to further extend these benefits.

P109 - Minimal Invasive Orthopaedic Surgery in Children with SMA. Early results in hip and knee joints

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Prior to Disease Modifying Therapies (DMTs), Orthopaedic Surgery in lower limbs of children with SMA was rarely indicated due to lack of symptoms, high recurrence and failure rates.

With DMTs, a new cohort is experiencing hip- and knee-related problems, prompting renewed interest in surgical treatment strategies. This is the first report worldwide to report on Minimal Invasive Orthopaedic Surgery(MIOS) in SMA.

Seven patients (4 SMA I, 2 SMA II, 1 SMA III; mean age 5.6 years) underwent MIOS in hips(to prevent hip dislocation) and knee joints(to limit knee contractures). Pre-op hip migration averaged 35% and fixed knee contractures 20°. All patients were discharged on the day after surgery and had uneventful recovery, no complications, and effective pain control. They all resumed baseline motor activities within 24h post-surgery. WHO mobility class was maintained while motor scores remained stable at 4-month follow-up. MIOS is safe with rapid post-op recovery and potential benefit in SMA.

P20 - Enhancing Cognitive and Developmental Testing in Children with SMA

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Three breakthrough treatments have dramatically improved survival in children with the most severe form of spinal muscular atrophy (SMA type 1). However, many of these children still face challenges with learning and development, which suggests that SMA may also affect the brain.

To explore this, we're using a mouse model of SMA and testing behaviours linked to anxiety, social interaction, and repetitive actions. We found that SMA mice treated immediately after birth survived and moved normally, but showed serious behavioural problems. In contrast, SMA mice treated before birth behaved just like healthy controls, showing no signs of these issues.

These findings suggest that early—especially prenatal—treatment may be crucial not only for survival and motor function, but also for protecting brain development and behaviour. This research highlights the importance of timely treatment to help children with SMA reach their full potential.

P124 - A multi-omic and organoid-based platform for Spinal Muscular Atrophy biomarker discovery

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Recent breakthroughs in SMN replacement therapies have transformed the treatment of Spinal Muscular Atrophy (SMA). However, the limitations of these therapies have now become evident, highlighting the need for the development of biomarkers to guide and monitor treatment. In this project, we used spinal cord organoids derived from SMA patient induced pluripotent stem cells as a platform to search for such biological markers, combining advanced multi-omics techniques with functional and immunophenotypic analyses.

P126 (also FLASH TALK) - Exploring the Trajectory of Swallowing Within Psychomotor Development in Spinal Muscular Atrophy: Moving Toward Integrated Care

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Spinal Muscular Atrophy type 1 (SMA1) is a severe neuromuscular disease with early onset, hypotonia, and bulbar involvement. Dysphagia is a hallmark and major cause of morbidity. Disease-modifying therapies (DMTs) improve survival and motor outcomes, but their effect on swallowing is unclear. This single-centre observational study (IRCCS Besta, 2021–2025) longitudinally assessed swallowing in SMA1 children on DMTs, in relation to motor and cognitive function. Swallowing was assessed with MAS, OrSAT, FILS, and p-FOIS for swallowing; motor with CHOP-INTEND; cognition with standardized tests. Patients were stratified by swallowing status, therapy, and treatment age; non-parametric tests were applied. Forty-one SMA1 children were included. Swallowing showed no significant change over one year, whereas motor function improved. Swallowing scales correlated moderately with motor and cognitive measures. These findings underscore the need for standardized longitudinal assessments.

P130 - Interaction of spinal microglia and astrocytes in late-onset Spinal Muscular Atrophy

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Not all SMA patients benefit from the current existing treatment options targeting the lack of functional SMN protein making the research on additional therapeutic approaches essential. Our group focuses on the role of glial cells in the pathogenesis of SMA and we have shown that activated astrocytes contribute significantly to motor neuron loss in a mouse model of late-onset SMA (SMA Type III).

Microglia are the immune cells of the central nervous system (CNS) and their response to pathological conditions has been shown in other neurodegenerative diseases like Amyotrophic Lateral Sclerosis (ALS) but has not been examined in late-onset SMA yet. It is known that microglia can induce astrocyte activation via the complement system and therefore probably influence disease pathogenesis.

We aim to identify the gain in therapeutic approaches by targeting microglia activation. This project will help to understand their role in late-onset SMA and possibly lead to new options for SMA treatment.

P132 - Targeting mitochondrial dysfunction in late-onset SMA mice: metformin as potential therapeutic drug

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Existing therapies for SMA have transformed outcomes in early-onset patients, but their benefits remain limited for those with late-onset disease. By identifying mitochondrial dysfunction and oxidative stress as key secondary drivers of motoneuron loss, this project reveals a new therapeutic possibility beyond SMN restoration. Using proteomics, in silico drug repurposing, and validation in both SMA mice and patient-derived fibroblasts, the study demonstrates that metformin, an already approved and widely used drug, can reduce oxidative stress, slow down motoneuron loss and improve motor function. This SMN-independent approach offers a translatable therapeutic potential for patients underserved by current treatments.

P136 - Motoneuron differentiation from iPSCs as a model for studying Spinal Muscular Atrophy

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Spinal Muscular Atrophy (SMA) is a genetic disease that affects nerve cells responsible for controlling muscles, leading to muscle weakness and loss over time. The disease is caused by a lack of protein called SMN.

To better understand how SMA works, our group use special stem cells called induced pluripotent stem cells (iPSCs), which can be turned into different types of cells, including the motoneurons affected in SMA. This study presents a method to create human motoneurons from these stem cells, using cells from both healthy people and SMA patients.

The study found that motoneurons from SMA patients show damage and alterations with survival and metabolism, especially when they don't get certain growth factors they need. These findings help explain why motoneurons die in SMA and suggest that increasing SMN protein levels might improve some of these problems. However, additional treatments will likely be needed to fully tackle this complex disease.

P138 – Criteria for identification and precise quantification of spinal motor neurons in disease mouse models

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Motor neuron diseases such as spinal muscular atrophy (SMA) are defined by the loss of motor neurons, the nerve cells that control muscle movement. Measuring this loss accurately in mouse models is essential to track disease progression and test treatments, but current studies use inconsistent methods and often report conflicting results. To solve this, we developed a standardized approach for motor neuron counting. We created a precise dissection protocol, identified reliable markers to label motor neurons, and showed that their distribution differs across spinal cord segments. We also found that motor neuron loss in a severe SMA mouse model is restricted to specific motor neuron pools. Finally, we introduced an automated analysis pipeline that enables objective, reproducible counting. Our approach provides a solid reference for future research and helps ensure that studies on new therapies are based on reliable measures of motor neuron loss.

P148 - Validation and longitudinal progression of the Italian Spinal Muscular Atrophy Independence Scale – Upper Limb Module: A Two-Phase Study

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Spinal muscular atrophy (SMA) is a genetic disease that weakens muscles over time. While treatments exist, it's hard to measure how independently patients can function in daily life. This study tested a new tool in Italian—the SMA Independence Scale – Upper Limb Module (SMAIS-ULM)—to assess how well people with different types of SMA can use their arms and hands in daily life activities. Over 470 patients and caregivers from 12 centers completed the questionnaires and in longitudinal phase over 150 questionnaires completed. The scale proved reliable and accurate, showing clear differences based on disease severity and movement ability. It worked well whether completed by patients or caregivers. Although it only showed modest links to traditional motor tests, it may add useful insights about patient independence. More research is needed to see how it performs earlier in treatment when patients may improve more noticeably.

P150 - Patient-reported experiences with SMA therapies in north Macedonia: Results from a 2025 survey

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This survey explored the experiences of people with spinal muscular atrophy (SMA) and their caregivers in North Macedonia. Results show that most patients benefit from current therapies, which improve daily functioning and wellbeing. However, many face challenges such as long travel to clinics, high costs, and complex treatment procedures. While satisfaction with treatment is generally high, patients hope for therapies that are more effective and easier to manage. The findings emphasize the importance of better access to care, reduced bureaucracy, and combined medical and psychosocial support to enhance quality of life for the SMA community.

P156 - The Brazilian National SMA Registry: Integrating Real-World Evidence and Advocacy to Shape Health Policy

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The Brazilian National SMA Registry collects information directly from patients and families living with Spinal Muscular Atrophy (SMA). It is the largest SMA registry in Brazil and among the largest in Latin America. This registry not only improves understanding of the disease but also gives families a way to influence health decisions in Brazil. For example, registry data have been used by the government to change rules and expand access to treatments that were previously out of reach for most patients. It has also been cited in official reports that decide which medicines are offered by the public health system. By connecting data, families, and decision-makers, the registry ensures that the real needs of the SMA community are recognized and addressed.

P158 - Onset of Scoliosis in Patients with Spinal Muscular Atrophy Type 1 (SMA 1): A Single-Centre Clinical Experience

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In a study of 9 SMA 1 patients (2 SMN2 copies), scoliosis developed in 8 despite early disease-modifying therapy (DMT). DMT was initiated early: 2 presymptomatically/ oligosymptomatically at 3 weeks; symptomatic patients averaged 7.5 months. The only patient without scoliosis was a 3.5-year-old walker who received presymptomatic therapy.

Scoliosis onset occurred: Early (<6 months) in 3 patients (later DMT, all sitters, 1 required ventilation). Later (>12 months) in 3 patients (later DMT, all required nocturnal ventilation).

Conclusion: Scoliosis remains a highly prevalent and often early-onset comorbidity in SMA 1, despite early DMT and supportive care (physiotherapy, bracing). These therapies may not prevent severe spinal deformity, highlighting the need for proactive orthopaedic monitoring from a very young age.

P170 - Proteomic profiling of cytoplasmic stress-induced liquid condensates of SMN

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We have discovered that the Survival of Motor Neuron protein (SMN)—known for its association with spinal muscular atrophy (SMA)—forms special liquid-droplet-like structures called "S-bodies" in the cytoplasm of stressed human cells. These structures, triggered by physical or chemical stress, are dynamic and appear to be crucial for ensuring cellular survival under these conditions. In contrast, the impaired gene product of SMN found in SMA patients lost its capacity to form S-bodies. Treatment with the approved drug Risdiplam, however, can restore this ability. Our study reveals that S-bodies also comprise proteins involved in RNA processing, suggesting they help restarting important biogenetic cell functions after stress. This highlights a new role for SMN as a stress regulator in cytoplasmic droplet-like structures and suggests that loss of this SMN function contributes to SMA.

P174 - SMN-independent rescue of spinal muscular atrophy by small drug compounds

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SMA is caused by SMN protein deficiency. Three SMN-dependent treatments that increase SMN levels and improve SMA patient's lifestyle and lifespan are available. However, current therapies can partially rescue SMA disease. There are many challenges and gaps in the knowledge of important aspects of current SMA treatments, including side effects and post-treatment complications. To overcome these challenges, there is an urgent need to develop alternative methods that are SMN-independent. This study investigated the therapeutic potential of pharmacological inhibition of JNK using small drug compounds for the treatment of SMA and generated a proof-of-concept for an SMN-independent method for the treatment of SMA. In summary, the findings of this study demonstrate that pharmacological inhibition of JNK is a viable therapeutic option for the treatment in combination with SMN increasing methods for severe forms of SMA, or as a stand-alone, SMN-independent method for moderate and mild SMA.

P178 - SmFD37N suppresses SMNE134K loss of function by enhancing Sm-ring assembly activity

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It is currently unknown why low levels of SMN cause SMA. SMN has been suggested to perform several key functions within the cell. Which of these roles are determinants of SMA pathology? To address this, we performed an unbiased screen in cells expressing only SMNE134K to mimic SMA pathology and looked for genomic mutations that compensate the absence of functional SMN. We identified a mutation in one core protein component of all pre-RNA splicing machinery (spliceosome), SmFD37N. Interestingly, assembling the central block of all spliceosomes is one of the best studied functions of the SMN complex, We used cell biology and biochemical approaches to confirm the recovery of activity of the SMA mutant SMNE134K in the presence of SmFD37N. The ability of this mutation in the core spliceosome protein suggests spliceosome assembly to be the key malfunctioning pathway in the SMA etiology of SMNE134K. We are currently using transgenic SMA mouse models to validate these findings.

P180 - Family Relocation in Spinal Muscular Atrophy: SAPRE Centre experience over the last decade

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Families of children with Spinal Muscular Atrophy (SMA) often migrate seeking not only medical treatments but also better quality of life and social inclusion. Over ten years, the SAPRE service in Milan supported 100 migrant families, mainly from Eastern Europe, whose children had SMA types 1, 2 or 3. Families completed questionnaires on their reasons for moving, needs and expectations, and took part in a program aimed at empowering parents in daily disease management. Results show that motivations have evolved: while in the past migration was driven mainly by access to drugs and specialized care, today families equally value medical support and the acquisition of practical skills for living with SMA in an inclusive community. Migration highlights persistent gaps in home countries and underlines the importance of "global care" that integrates health, socio-economic support and quality of life into standard care models for SMA.

P194 - Exploring perceptions of Pilates-based exercise in adults with SMA

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Pilates is a system of exercises aimed at improving trunk and core strength and overall wellbeing. Pilates videos for people with neuromuscular conditions were developed in 2023. This project aimed to explore the perceptions of Pilates exercise and self-management using online Pilates resources in adults with SMA.

A questionnaire was sent to all adults with SMA attending two hospitals in the United Kingdom. Initial data shows adults with SMA reported that they believe Pilates and strengthening exercises have a positive effect on their overall health and are suitable for people with SMA. However, there were some people who were unsure of the benefits of a Pilates programme.

The data demonstrates that although adults with SMA believe Pilates-based exercises are helpful, there is still work to be done around highlighting the benefits of these exercises and accessibility of the Pilates video resources.

P198 - Enhancing Bulbar Assessment in Spinal Muscular Atrophy: A Rasch Analysis of the International Bulbar Assessment Tool (iBAT) Pilot Study

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People with SMA often have trouble with eating, drinking, and speaking due to muscle weakness in their mouth and throat. While new treatments help, we need better tools to measure these problems and track improvement.

We developed the International Bulbar Assessment Tool, a simple patient/caregiver questionnaire. After testing it with patients worldwide, we found the original 93 questions needed improvement.

In January 2025 we held a workshop bringing together clinicians, SMA individuals/caregivers, advocacy groups and industry representatives to refine the tool. Together, they reduced it to 42 questions that work much better.

We then tested the improved tool with new patients to confirm it works properly. This collaboration between all stakeholders was essential for creating a tool that truly serves the SMA community's needs.

The iBAT will help clinicians better understand and monitor bulbar problems in SMA patients across all ages and disease severities.

P200 - The role of personalized legs orthosis in pharmacologically treated SMA 1 patient in the first year of life to promote the physiological development

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Children with spinal muscular atrophy (SMA) type 1 live longer and achieve new motor abilities thanks to innovative treatments. Yet, weakened muscles and joints still require proper support. Custom-made leg orthoses are essential to stabilize joints, improve mobility, reduce fatigue, and adapt to daily activities, from walking to resting. Different devices may be used depending on needs: ankle-foot orthoses (AFOs), knee-ankle-foot orthoses (KAFOs), or hip-knee-ankle-foot orthoses (HKAFOs). Creating an orthosis involves patient evaluation, plaster casting, adjustments, and active collaboration with families. Training for parents, caregivers, and teachers is crucial to ensure correct use in everyday routines. Early adoption of orthoses supports psychomotor development, helps children reach motor milestones, promotes participation in social and school life, and enhances autonomy and independence.

P202 - Caring for the mind is caring for life: the initiative to create a booklet on mental health for people living with rare diseases

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The booklet Caring for the Mind is Caring for Life, produced by the Viva Iris Institute, addresses historical gaps in comprehensive care for people with rare diseases. It transcends the role of informational material, establishing itself as a tool for resistance, awareness, and mental health promotion. It reinforces the importance of including mental health as an inseparable part of the care provided to people with rare diseases and is in line with international perspectives that recognize mental health as a cross-cutting priority. The World Health Organization argues that mental health policies should be integrated with other public health policies, avoiding fragmentation. For rare diseases, this integration is even more urgent, given the high emotional impact of diagnosis and the chronic nature of the conditions. Experience reaffirms that collaborative initiatives, led by patient associations, have transformative potential by integrating science, lived experience, and advocacy.

P204 - 5Q SMA emergency management support tool: collaborative construction of an emergency card

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In acute hospitalization, patients with Spinal Muscular Atrophy (SMA) are more vulnerable due to their specific clinical characteristics. They may require frequent emergency hospitalizations, and the professionals available in the emergency room do not always have adequate knowledge about the disease. The "SMA 5q Emergency Card," developed by specialists, brings together essential recommendations applicable to all types of SMA with guidelines for emergency cases. The card does not replace the decisions of the healthcare team, nor is it mandatory. Its purpose is to provide emergency professionals with quick access to information about the patient's condition for safer management. Thus, the card has a high impact on expanding knowledge about the disease and its treatments and, if used in cases of unfamiliarity with the disease, can contribute to the appropriate treatment of patients with SMA.

P208 - From Indonesian Islands to the Lab: Practical SMA Genetic Testing in Resource-Limited Settings

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Indonesia's remote islands face significant challenges in the early diagnosis of spinal muscular atrophy (SMA) due to limited access to genetic testing. We implemented a locally adapted blood card to safely collect and transport samples to a central laboratory at the University of Gadjah Mada, Yogyakarta. Genetic testing successfully confirmed SMA and revealed a rare NAIP exon 5 deletion. In parallel, collaboration with stakeholders is essential to establish a referral system by educating paediatricians and general practitioners in rural areas on early recognition of SMA and proper sample collection. This combined approach demonstrates how community-driven innovations and professional education can expand equitable access to timely diagnosis and care for children in underserved regions.

P131 - Astrocytic inward rectifier potassium channel Kir4.1 dysfunction as a target for new therapeutic strategies in late-onset Spinal Muscular Atrophy

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This project addresses a critical unmet need in late-onset Spinal Muscular Atrophy (SMA), where current SMN-enhancing therapies often show limited benefit. By uncovering astrocytic Kir4.1 channel dysfunction as a novel disease mechanism, it shifts the focus from motoneurons alone to the crucial role of non-neuronal cells. The study not only identifies a pathological cascade leading to motoneuron vulnerability but also demonstrates that repurposed, approved drugs can effectively protect motoneurons in vivo—without altering SMN levels. This translational approach offers realistic therapeutic options for patients currently underserved by existing treatments.

P137 - Astrocytic Alterations in 5q Spinal Muscular Atrophy: A Human Cell Model Approach

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Astrocytic dysfunction is an early pathological change in SMA and may influence progression and treatment response. As SMN-targeted therapies show limited efficacy in advanced stages, other mechanisms need investigation.

Adults with SMA underwent detailed clinical characterization. PBMCs were isolated from blood samples, transfected, and differentiated via neural precursors into astrocytes; controls were generated in parallel. Morphology, marker expression, function, and proteomic profiles were analyzed and correlated with clinical data.

Patient- and control-derived astrocytes were successfully generated, showed typical markers and electrophysiological properties. Comparative analyses and first proteomic findings will be presented.

This minimally invasive approach enables the study of patient-specific astrocytic mechanisms in SMA, potentially explaining heterogeneity in progression and treatment response beyond SMN-dependent pathways.

P153 - A national action plan dedicated to emergencies DRIVEN by the French association AFM-Téléthon

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To better mobilize all the stakeholders, the AFM-Téléthon made the choice, in France, to have a national action plan dedicated to emergencies. In addition, the AFM-Téléthon has created or contributed to the development of six essential tools for structuring and coordinating the health care of each patient: family helpline, a booklet, emergency cards, emergency liaison document, emergency kit, Orphanet emergencies.

P173 (also as FLASH TALK) - Beyond spinal motor neurons: cortical projection neuron numerical and morphological alterations reveal selective vulnerability to SMN loss also in the brain

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Spinal Muscular Atrophy (SMA) is usually seen as a disease of spinal motor neurons, but growing evidence shows the brain is also affected by SMN loss. In our study, using a severe SMA mouse model, we found that specific cortical neuron populations -particularly the corticospinal one, those connecting with the spinal cord neurons- degenerate in SMA brain and show early morphological alterations, together with changes in dendritic spines (important structures of the neurons that mediate neuronal communication). Some alterations also appear during development, long before motor symptoms arise. Importantly, not all cortical neurons are equally vulnerable. These findings broaden the view of SMA pathogenesis, revealing that understanding how cortical projection neurons are selectively compromised will open new opportunities to protect the brain, ultimately improving motor and cognitive outcomes and guiding therapies that address the full impact of SMA.

P175 - Genetic Insights into SMA: Beyond Copy Number to Modifiers and Cohort Screening

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SMA is caused by too little of a vital protein for nerves to function properly. In patients, the SMN1 gene is missing or doesn't work, and SMN2 can only help partly. Usually, more SMN2 copies mean a milder disease, but some patients do not follow this pattern: Some Type 3 patients have only 2 copies, like many Type 1 patients. This study is driven by the question: why do people with the same mutation and SMN2 copies have different experiences of the disease? One explanation appeared in a Type 3 patient with 2 SMN2 copies. Analysis showed a known modifier, which helps SMN2 produce more functional protein. By analyzing NDAL's patients, we found that someone with an MND diagnosis has SMA, giving her the opportunity to start treatment; this highlights the importance of uncovering hidden SMA. Our study is the first in Türkiye to combine molecular methods to study SMA. Once among the cruelest diseases, SMA is now a hopeful condition that becomes even more promising with collective efforts.

P177 - Targeting autophagy partially rescues neuromuscular function and extends lifespan in a C. elegans model of spinal muscular atrophy

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Spinal muscular atrophy (SMA) is a devastating genetic condition that causes progressive muscle weakness and is often fatal in infancy. It is driven by low levels of an essential protein called SMN, but why motor neurons are especially vulnerable is not fully understood. One process that may play a role is autophagy—a natural recycling system that cells use to clear waste and stay healthy. Using a tiny worm model (C. elegans), we found that while genes linked to autophagy were switched on, the recycling process stalled at a late stage, leaving damaged components to build up. We then tested drugs that either boost or block autophagy. Strikingly, several activators improved movement, increased SMN protein levels and extended survival in diseased worms, while inhibitors had no benefit. These results highlight faulty cellular recycling as a core feature of SMA and suggest that enhancing autophagy could offer a new therapeutic strategy, or supplement current treatments.

P179 - Two-Year Efficacy and Safety of Risdiplam Treatment in Adult Patients With Spinal Muscular Atrophy: Motor, Respiratory, and Patient-Reported Outcomes

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Spinal muscular atrophy (SMA) is a rare genetic disorder that causes progressive muscle weakness, loss of motor function, and difficulties with swallowing and breathing. Risdiplam (Evrysdi®) is an oral therapy that increases levels of a protein called SMN, which is deficient in people with SMA.

In this study, 18 adults with SMA types 2, 3, and 4 received Risdiplam treatment for 24 months. Participants experienced important improvements in motor function, swallowing, fatigue, and quality of life. Respiratory function remained stable, whereas a decline had been observed in the five years before treatment. Risdiplam was well tolerated, with no major safety concerns.

These findings show that long-term Risdiplam treatment can slow down the disease progression and improve daily functioning and overall well-being in adults with SMA, supporting its use as a safe and effective therapy for this population.

P181 - The ACE SMA study: 18-month single site, acceptability, feasibility, safety and efficacy data of an optimised rehabilitation program for treated patients with SMA in the United Kingdom

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Current standards of care within spinal muscular atrophy (SMA) highlight the importance of increased physiotherapy and proactive individualised rehabilitation alongside treatment. Yet in the UK, a survey in 2022 highlighted a large unmet need of regular physiotherapy.

The ACE SMA study aims to determine if more frequent and individualised physiotherapy is up taken and is feasible by patients living with SMA and their families in the UK. The study provides 14 patients living with SMA, hands-on physiotherapy sessions every two weeks with the use of a rehabilitation device at home over 18-months. 6-month results show that 93% accepted to participate, 100% completed their 6-month visit and 90% would recommend the individualised program.

We aim to present the 12-month data of 13 patients alongside safety, effectiveness and compliancy data. The ACE SMA study hopes to provide a concept for regular optimised physiotherapy to support integration into SMA standard of care pathways in the UK.

P193 - Launching the First SMA Patient Registry in Vietnam: Patient-Reported Data, Early Insights, and Patient Participation

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Spinal muscular atrophy (SMA) is a serious rare disease, but until now, Vietnam had no system to collect information about patients and their needs. In April 2025, we launched the first national SMA patient registry, where families can share information about their condition, treatments, and daily challenges. The registry is unique because patients not only provide data but can also see the overall results, helping them feel connected to the community. So far, 194 patients from 30 provinces have joined, giving us the first clear picture of SMA in Vietnam. The data show many children are very young, treatment access is limited, and most families cannot afford new therapies without support. This registry is an important first step to push for government, insurance, and community help, and to show international partners that SMA families in Vietnam are ready for treatment access and better care.

P195 - Study of understanding patterns of exercises, physical activity and falls: What can we learn from a large real-world cohort of Adult SMA Patients?

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We studied physical activity and falls in over 350 UK adults with SMA. People with SMA face challenges staying active due to muscle weakness and fatigue, yet exercise is crucial for maintaining function and quality of life. Using a questionnaire called RAPA, we measured how much adults with SMA exercise compared to NHS recommendations. This is the first large study to assess activity levels across different SMA functional types.

We also tracked falls in ambulant patients. SMA causes weakness, poor balance, and fatigue that increase fall risk during walking, standing, or transfers. Understanding falls patterns help identify who's at risk and how to prevent injuries.

Our findings help doctors give personalized exercise advice based on what others with similar abilities safely achieve. This empowers patients to understand if their activity levels are typical and provides realistic fitness goals tailored to their functional stage, improving care and quality of life for the SMA community.

P199 - Benchmark analysis of rehabilitation gaps in spinal muscular atrophy: insights from Slovenia, Bulgaria, and Turkey

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Spinal Muscular Atrophy (SMA) is a rare disease that causes progressive muscle weakness and severe physical limitations. This condition challenges not only patients but also their families physically, psychologically, and socially. While rehabilitation services are critical for improving quality of life, significant barriers to access exist in Slovenia, Bulgaria, and Turkey. These include a scarcity of centers, limited time available, financial burdens, and a shortage of specialists. Our study compares these three countries, highlighting families' experiences and systemic gaps, and offers recommendations for more equitable and sustainable solutions. This aims to guide improvements that directly impact the lives of both patients and families.

P201 - Impressions and impact of a children's literature project on health literacy and awareness of a rare condition through stories of a character with SMA

A. Giuliani, B. Rodrigues, B. Estevam, M. Xavier

Viva Iris Institute

"Aventuras de Titi" arose from the understanding that children's literature is a tool for sharing information about diversity in a light, playful, and awareness-raising way. The stories are inspired by a girl born with type 2 spinal muscular atrophy, who faces important issues such as understanding her limitations, giving rise to reflections through the dialogues presented, and showing situations common to any child her age. Thus, children with disabilities can feel represented in the illustrations and develop a positive self-image. And children without disabilities have the opportunity to learn about differences and understand diversity in a playful and representative way. The set of children's book publications, storytelling activities, meetings, and lectures has already resulted in more than 20,000 printed books, more than 12,000 books distributed free of charge, impacted more than 1,170 cities in Brazil, and reached the US and Africa with the English version.

P203 - Spinal muscular atrophy patient journey in Minas Gerais: mapping, challenges and perspectives

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The Patient Journey with SMA (Spinal Muscular Atrophy) Project in Minas Gerais (MG) developed solutions, in line with the State Policy for Comprehensive Care for People with Rare Diseases in MG, which were validated by the State Health Department and have great potential to contribute to improving care. This is an example of how structured approaches in health innovation ecosystems based on collaboration can generate effective results. Given the similarity of the challenges faced in other states, the project presents itself as a replicable model with the potential to benefit SMA patients across the country. Bringing together 26 leading SMA professionals on a voluntary basis resulted in the creation of material with: Definition of Care Levels for SMA patients; Proposals for Decentralization of Care and Scope of Training for the care team; Mapping of challenges in the patient's journey and the Emergency Card for SMA patients.

P205 - Impact of SMA on oral health profile in children

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SMA could be defined as a multiorgan disease. Many clinical research groups are working on therapeutic strategies to treat pathologies in peripheral organs. However, knowledge about oral diseases and changes is largely unknown. Oral health not only has a significant impact on the entire organism but is also closely linked to patients' functional maintenance and self-esteem. This clinical study is the first study worldwide in which dental and oral parameters (e.g. caries prevalence, home biofilm management and periodontal parameters) were collected in SMA patients and in their healthy siblings. Saliva parameters such as buffer capacity and pH value were also measured. The values collected represent outstanding added value for the dental care of SMA patients. Prevention is of paramount importance, especially for vulnerable groups such as SMA patients. The results of this study can be used to develop targeted prevention concepts and treatment strategies for oral health.

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