SPINAL CORD INJURY MUST BECOME CURABLE
Millions of people who have sustained a spinal cord injury suffer from problems that are hard to imagine. They cannot walk, they do not have feeling in parts of their body and they may not have control of their bowel or bladder. Many cannot even use their arms and hands and need help 24 hours a day.

Together we can help. We are a spinal cord research foundation and we fund research projects and clinical studies around the globe aimed at finding a cure for spinal cord injury.

The discoveries made through these research projects provide hope that it will be possible to improve the quality of life of people with spinal cord injuries and bring about their recovery.

Support us in achieving our goal. 100% of every donation goes to spinal cord research.
In most cases paralysis is caused by acute damage to the spinal cord following a traumatic injury. Nerve fibres are disrupted and nerve cells at and around the site of injury are destroyed.

A lesion of the spinal cord not only impacts the ability to move your limbs; the injury also causes a large number of health-related complications and limitations in daily life.

After a spinal cord injury, the nerve fibres that send motor signals from the brain to the torso and the limbs are impaired, causing paralysis of the muscles. Destruction of sensory nerve fibres leads to loss of sensations such as touch, pain and the ability to distinguish between hot and cold.

A lesser-known fact is that spinal cord injury can also severely limit your ability to control your bladder and bowel, sexual performance and blood pressure.
HOW YOU CAN HELP
THE SCIENCE
WHAT WE DO
SPINAL CORD INJURY

IT CAN HAPPEN TO ANYONE

MORE THAN
250,000
TRAUMATIC
SPINAL CORD INJURIES
EVERY YEAR*

The main causes are accidents in daily life

50% Road accidents
24% Falls
17% Other causes
6% Sports
3% Extreme sports

53% Paraplegia
Paralysis of the torso muscles and the lower limbs.

47% Tetraplegia
Paralysis of the torso muscles, the lower limbs and the arm muscles.

The higher the injury, the more bodily functions are affected:

- **Cervical spine (C1–C8)**
- **Thoracic spine (T1–T12)**
- **Lumbar spine (L1–L5)**
- **Sacrum (sacral bone)/Coccyx (tailbone) (S1–S5)**

Find out more about the spinal cord and the effects of spinal cord injury on the human body.
The driving forces behind Wings for Life are the two-time motocross world champion Heinz Kinigadner and the founder of Red Bull, Dietrich Mateschitz.

In 2003, Kinigadner’s son Hannes had a tragic accident that left him tetraplegic. Moved by the dreadful injury, Kinigadner and Mateschitz invited leading scientists from across the world to come to Salzburg. It soon became clear that, contrary to common opinion, there is legitimate reason to hope that traumatic spinal cord injury can be cured. Groundbreaking discoveries made by Prof. Sam David in 1981 and by Prof. Martin Schwab in the early 1990s showed that injured nerve cells in the spinal cord are capable of regeneration after specific types of treatment.

Kinigadner and Mateschitz soon realised that research into spinal cord injury was underfunded. Paralysis is not considered a widespread condition so investing millions in research to help a relatively small number of people was generally thought to be an unprofitable endeavour for the medical industry.

This realisation prompted Kinigadner and Mateschitz to set up the Wings for Life research foundation – with the goal of finding ways to cure all those affected.
Level 1: Basic and preclinical research

A spinal cord injury interferes with a complex system – the central nervous system. To find treatments it is essential to understand the basic biology of the disease processes and discover the building blocks for new therapeutic interventions.

Level 2: Clinical studies

Those therapies or drugs that prove highly promising in basic and preclinical research must be tested in a clinical study to understand how well they can be tolerated and how effective they are in humans with a spinal cord injury.

Clinical studies span a period of at least eight years and cost millions. What is more, a large number of comparable patients is also needed, which can make it even more difficult to perform clinical studies.

Wings for Life has designed a programme to support and accelerate the progress of research into clinical outcomes. The Accelerated Translational Programme (ATP) financially supports its successful applicants and offers advice through a network of experts.

Level 3: Communication

Scientific communication plays an important role in the advancement of research. Wings for Life organises international conferences every year to bring together leaders in research and medicine. The foundation also ensures that funded scientists publish the findings of their projects. Furthermore, Wings for Life organises a Summer School together with other foundations to promote the next generation of researchers.
Key areas of research

MANY WAYS TO ACHIEVE OUR GOAL

Wings for Life has defined the following key areas of research:

- **Secondary damage (protection of intact cells)**
  A spinal cord injury is followed by a massive breakdown of neural and supporting cells (known as glial cells) around the site of injury. This area of research aims to prevent such secondary damage and therefore preserve more functions for those affected.

- **Plasticity (elimination of growth inhibitors)**
  A spinal cord injury is accompanied by the release of substances that block the renewed growth of nerves. The aim is to find, analyse and eliminate these substances, known as natural growth inhibitors. In the last few years major advances have been made in this area of research.

- **Regeneration (nerve growth)**
  When an adult nerve fibre in the central nervous system is completely severed, its ability to regrow is very restricted. Wings for Life funds projects that look for ways to stimulate nerves to regenerate and grow.

- **Neural reconstruction (introduction of new cells)**
  This area of research aims to replace destroyed tissue by introducing reconstructive cells and materials. The most promising approaches focus on the use of stem cells or prosthetic biomaterials to repair injured spinal cord tissue.

“We’re exploring every avenue that could make our vision a reality.”

Prof. Ludwig Aigner, Paracelsus Private Medical University of Salzburg, Austria
Remyelination (insulation of nerve fibres)

Injured nerve fibres lose their protective cover, known as the myelin sheath. Like an electric wire that loses its insulation, the nerve fibres lose their ability to transmit signals. Wings for Life supports research that aims to restore this protective sheath and improve nerve cell function.

Imaging

A number of preclinical approaches have been developed to stimulate the growth of nerve fibres. However, we currently lack imaging procedures that would make it possible to monitor this growth as it occurs. This fact makes it difficult to determine exact causes and compare results. Wings for Life is doing pioneering work in this field.

Compensation treatment

Projects of this type are not focused on direct restoration of the injured nervous system, but on managing the side effects of the injury and thus improving the affected individual's quality of life.
Every year, Wings for Life receives a large number of applications from researchers applying for support. In order to make objective decisions about whether the projects are of high scientific merit, these applications undergo a thorough selection process consisting of several stages. Wings for Life therefore ensures that every donation to the organisation is invested in the best possible way.

- **Scientific Director**
  Prof. Jan Schwab, Ohio State University, Wexner Medical Center

- **Clinical Director**
  Prof. Armin Curt, Balgrist University Hospital

- **Internal Scientific Advisory Board**
  Prof. Ludwig Aigner, Paracelsus Private Medical University of Salzburg
  Prof. Hartmut Pelinka, former director of AUVA
  Prof. Claudius Thomé, Innsbruck University Hospital

- **Scientific Advisory Board**
  Prof. Zhigang He, Harvard Medical School
  Prof. Michael Sofroniew, University of California, Los Angeles
  Prof. Sam David, McGill University, Montreal
  Prof. Hans Lassmann, Medical University of Vienna
  Prof. Stephen M. Strittmatter, Yale University
  Prof. Philip Van Kerrebroeck, Maastricht University
  Prof. Andrew Maas, Antwerp University Hospital
In the last few years Wings for Life has succeeded in initiating a large number of promising projects, especially in the fields of basic and preclinical research. The next major step will be to translate these into clinical studies that ultimately lead to treatments for spinal cord injury.

Due to the complex nature of paralysis, a combination of various therapeutic approaches seems to offer the best chances of success. Major approaches currently under development include:

- **Reducing secondary damage**
  The most advanced area of research relates to treatment options for patients in the early stages after a spinal cord injury. Preclinical studies have shown that additional tissue damage can be markedly reduced by timely administration of the drug known as Minocycline. A first clinical study performed at the University of Calgary resulted in greater motor recovery of the patients, preserving more functions. These results will be verified in a phase III study with a larger group of patients.

- **Eliminating growth inhibitors**
  After a spinal cord injury, the spinal tissue contains a lot of cell debris, which can significantly limit the regeneration of nerves. Various types of cell debris send signals to nerve fibres saying: “Stop. This is a dead end”. One of the stop signs responsible is known to be the protein Nogo. Following a successful phase I clinical study testing safety, an antibody against Nogo A is currently being tested in a clinical phase II study for patients with traumatic spinal cord injuries. In a model for those living with a spinal cord injury as an ongoing condition, Prof. Stephen M. Strittmatter (member of the Scientific Advisory Board of Wings at Wings for Life) and his research team
have succeeded in blocking several of these stop signs simultaneously and as a result have seen marked functional improvements.

Nerve growth

Nerve cells in the central nervous system lose most of their ability to regenerate as they mature. Researchers are therefore focused on “switches” that would overcome this challenge. The research group working with Prof. Zhigang He at Harvard Medical School’s paediatric teaching hospital (Boston Children’s Hospital) has found that it is possible to trigger the regeneration of axons to a previously unknown extent by eliminating two molecular stop signs (PTEN and SOCS3) within the nerve cell.

Cell-based approaches

Based on successful preclinical projects, there are great hopes for therapies using stem cells because these cells are able to form tissue scaffolds, release growth factors, form new circuits and promote the regrowth of the protective myelin sheath. Important questions still remain concerning cell transplantation into the injured spinal cord. Answers concerning the safety of neural human precursor/stem cells have been sought in a clinical study led by Prof. Armin Curt at the Balgrist University Hospital. The further testing of the approach has already started in a phase II study.

Electrical stimulation

A number of clinical trials are investigating how electrical stimulation of the spinal cord improves functional outcome after spinal cord injury. Electrical stimulation might be able to amplify residual signals or to activate networks of nerve connections that are independent of the brain.

The developments that have been demonstrated so far provide major hope that treatment options are closer than they have ever been. However, intensive research will be needed before a breakthrough in human medicine can be achieved. With commitment, enthusiasm and strong determination, at Wings for Life we will continue to make progress towards our vision.
Millions of people with spinal cord injuries share a single dream. It is our responsibility to raise the funds and create the right environment to make this dream a reality.

Funding research projects is one of the most important tasks of Wings for Life. Research is time-consuming and costly. Advancement in spinal cord research is largely based on private initiatives. Wings for Life is dependent on donations from individuals and companies. 100% of all donations are used for research purposes because all administrative costs are generously covered by Red Bull.

“Fate doesn’t ask. Spinal cord injuries can happen to anyone, so it’s important to pool all our resources and work with the utmost commitment to find a cure for this condition.”

—Anita Gerhardt, President and Chairman
The Wings for Life World Run is a global running movement for spinal cord research. Once a year thousands of participants start at exactly the same time in different locations around the globe.

What is absolutely unique at this running event is the moving finish line. After runners start, “Catcher Cars” set off at a specified speed to chase the participants.

The Catcher Car is their finish line, so when the Catcher Car reaches them, their race is over. The last woman and the last man running are the global champions.

The slogan is “Running for those who can’t”. From enthusiastic beginners to professional athletes, everyone can take part. 100% of the entry fees and donations go to spinal cord research focused on finding a cure for spinal cord injury.

Find out more and sign up here: www.wingsforlifeworldrun.com
Would you like to support us by making a donation?

▶ To make a donation online visit:
www.wingsforlife.com

▶ To make a donation by check:
Wings for Life Spinal Cord Research Foundation Inc.
1630 Stewart St.,
Santa Monica, CA 90404

Thank you very much.

Donations are tax-deductible

For more ways to help us, please visit our website:
▶ www.wingsforlife.com
“It always seems impossible until it’s done.”

—Nelson Mandela