The problem of this pathology lies in a change in a specific gene, which affects the function of certain brain areas: the cerebellum, the brainstem, the basal ganglia and the upper part of the spinal cord.

Therefore, Machado-Joseph patients have progressively impaired movement coordination, and loss of balance (the so-called “ataxia”).

The other name by which this disease is also known, Type 3 Spinocerebellar Ataxia, results from both the symptoms and brain areas involved.

Machado-Joseph is one of the most common genetic-based ataxias, but there are many similar diseases that are also classified as “ataxias.”

Unfortunately, this disease currently has no cure. Physiotherapy...

...and some medication helps reduce symptoms.

But there is hope, both in research and in ongoing clinical trials.

Some diseases are common, some not at all. These are called rare, or orphan diseases, and have a prevalence of less than 5 in 10 000 people.

It is estimated that there are 5 to 6 000 different rare diseases, affecting up to 6% of the population, which means that there are up to 600 000 people with these diseases in Portugal.

The Flores Island has the highest prevalence of the disease in the world.

A child with one diseased parent is 50% likely to have it, and symptoms manifest mostly when patients are between 35 and 50 years old.

A RARE JOU...
Researchers also create new models to be able to test all these strategies to ensure they are safe and effective before moving to the clinic. From new diagnostic and characterization tools... to advanced therapies including replacement of damaged cells, gene therapy such as gene editing to silence or correct the damaged gene... and the discovery of new molecules that can relieve symptoms, or delay disease progression.

At the CNC more than 30 researchers study Machado-Joseph Disease, using different strategies. At the CNC more than 30 researchers study Machado-Joseph Disease, using different strategies.

That is not the best approach, for two reasons. Firstly, because we have to address patients’ need for a therapy. Secondly, because these discoveries may have several additional applications in medicine and biotechnology and not only on ataxias... but also in other neurodegenerative diseases such as Alzheimer’s or Parkinson’s.

Sometimes the possibility that we should focus more on the study of common diseases is discussed. With the support of everyone, (patients, families, researchers, clinicians, and the general public), the ultimate goal is to make the effects of diseases such as Machado-Joseph’s rarer and rarer!

Funding:
European Regional Development Fund (ERDF), through the Centro 2020 Regional Operational Programme, Operational Programme for Competitiveness and Internationalisation (COMPETE 2020); the National funds through the Foundation for Science and Technology (FCT); the projects - BrainHealth2020 (CENTRO-01-0145-FEDER-000008), UID/NEU/04539/2019, ViraVector (CENTRO-01-0145-FEDER-022095), CortaCAGs (PTDC/NEU-NMC/0084/2014|POCI-01-0145-FEDER-016719), SpreadSilencing (POCI-01-0145-FEDER-029716), Imagene POCI-01-0145-FEDER-016807, CancelStem POCI-01-0145-FEDER-016390, POCI-01-0145-FEDER-032309, POCI-01-0145-FEDER-030737; under the projects SynSpread, ESMI and ModelPolyQ in the scope of the EU Joint Programme - Neurodegenerative Disease Research (JPND), the last two co-funded by H2020 programme from the European Union, GA No. 643417; and also by the “National Ataxia Foundation” (USA), by the American Portuguese Biomedical Research Fund (APBRF), APAHE – Portuguese Association for Hereditary Ataxia, and by the Richard Chin and Lily Lock Machado Joseph Disease Research Fund.