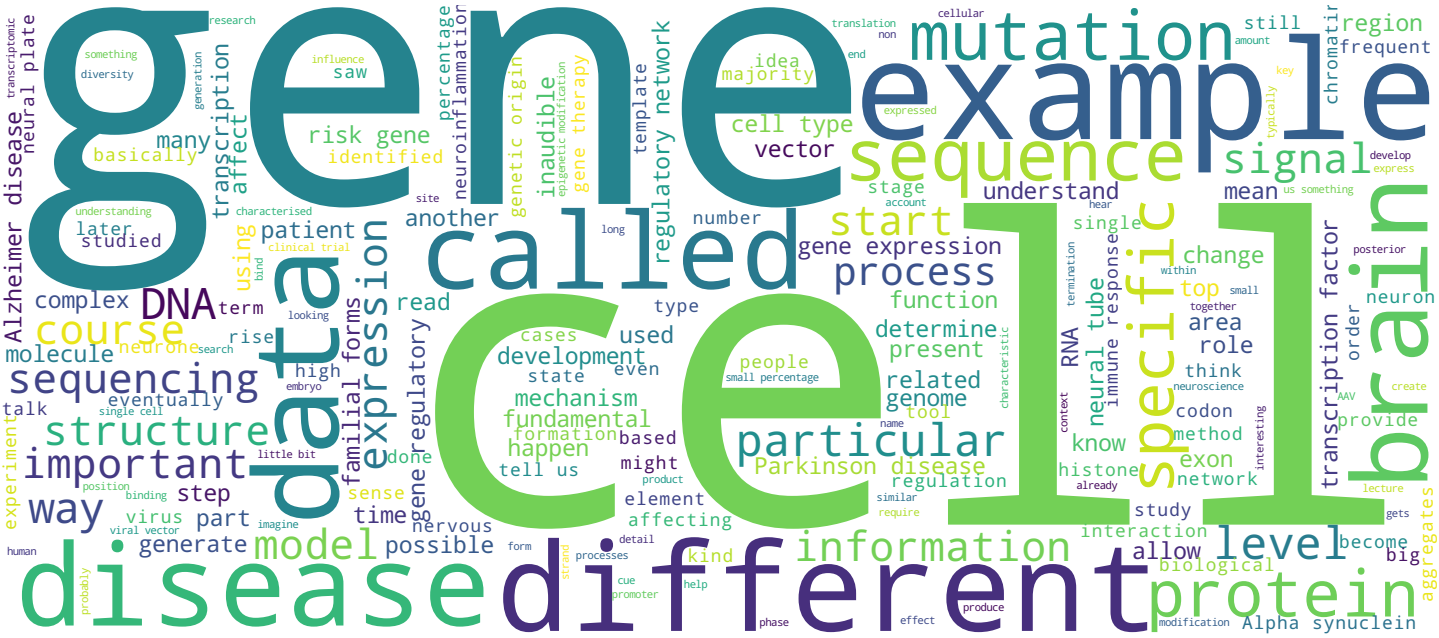


Search MOOC

Video

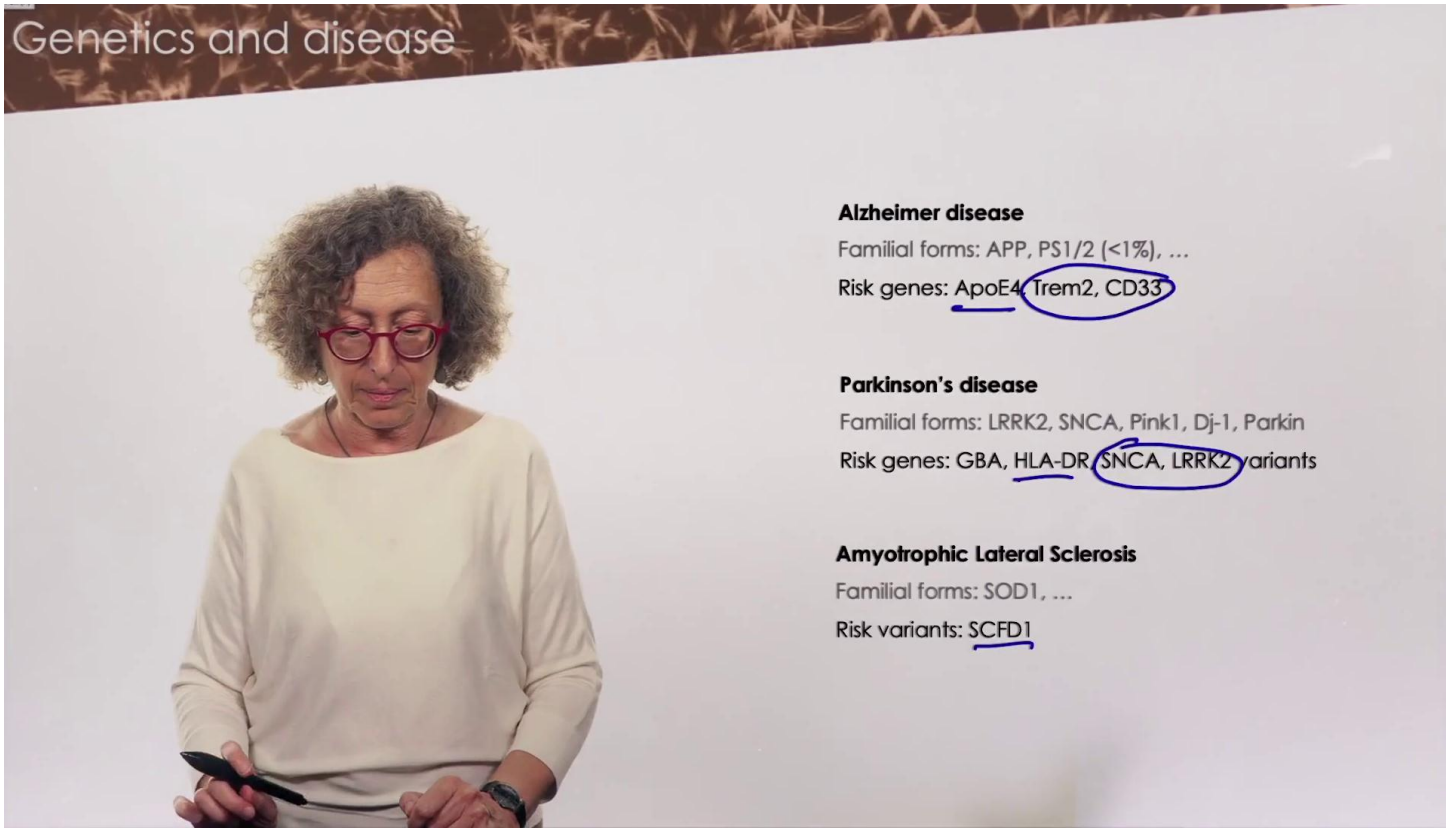
EPFL

But for actually the main neurological diseases, those about which you hear a lot because they are very frequent and they affect a lot of people are the multifactorial disease for which a clear genetic origin has not been identified and actually, it is believed that these diseases are multifactorial. They might have a genetic factor playing a role, but they are also environmental factor, ageing, and maybe even epigenetic factors. This is the case for Alzheimer's disease and Parkinson's disease, and also for ALS, amyotrophic lateral sclerosis. These diseases are much more complex and they will require a more complex approach. In these diseases, few case are nevertheless characterized by a mutation that can be inherited. These are called the familial forms, but it's only a very small percentage of the cases. Nevertheless, they are very much studied because this mutation can tell us something about the mechanism of the disease. For example, in Alzheimer's disease, the familial forms, a large percentage of these familial forms are affecting the metabolism of amyloids. Amyloids are protein that become misfolded and aggregates. And these aggregates are characteristic of the disease.

Notes

Summary

0m 05s

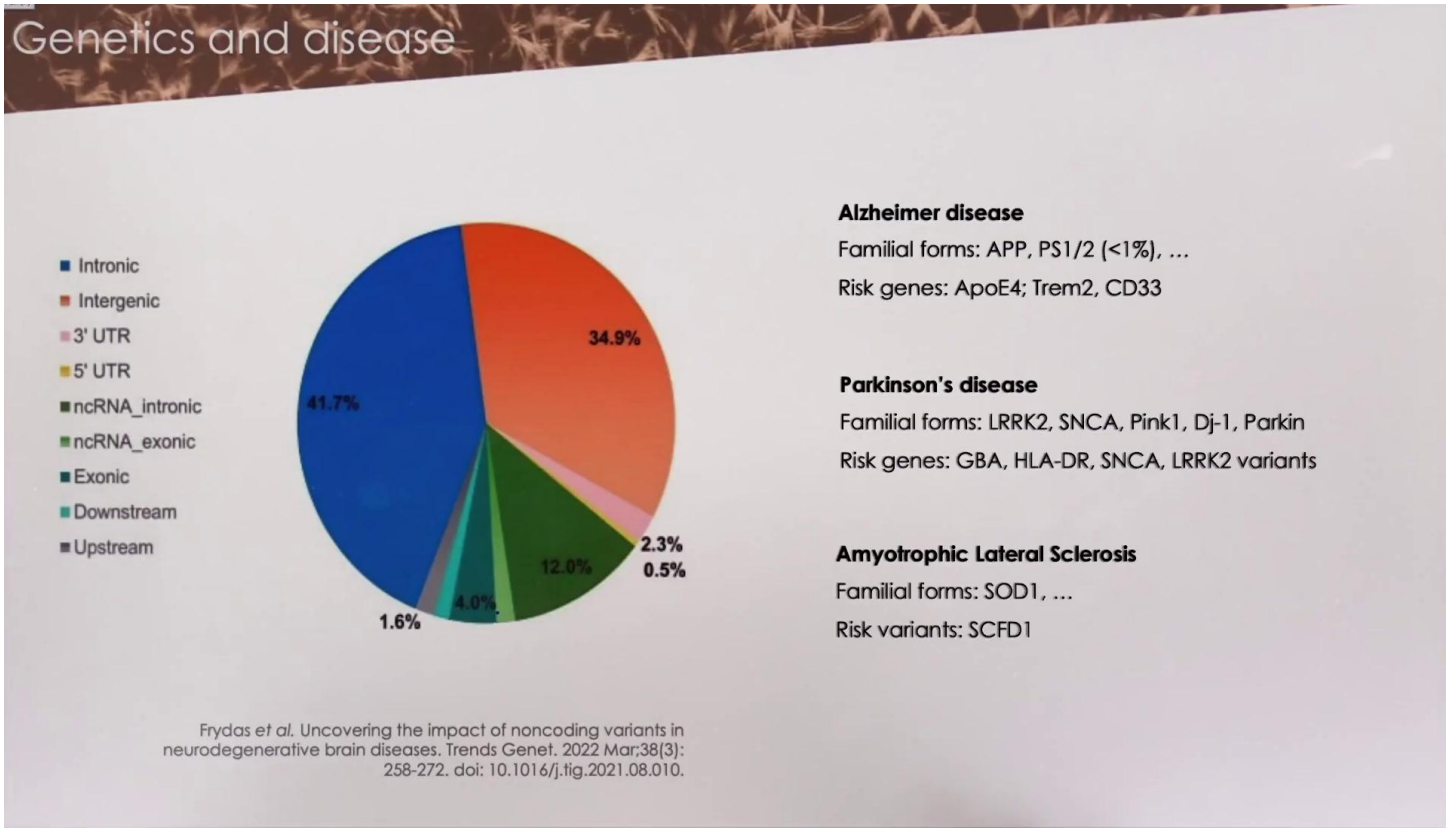


This mutation stimulates the research on amyloids aggregation. We have the same for Parkinson's disease, but in this case, it is Alpha-synuclein. The LRRK2 mutation, which is a very frequent one among the few percentage of familial Parkinson's disease forms is also affecting the folding and the aggregation of Alpha-synuclein. Then we have genes related to oxidative stress and neuroinflammation, which are also important factors in this disease. For ALS, there is also one mutation that has been... Probably more, that have been identified. But again, it's only a small percentage of the cases. Besides the few percentage of cases that have a clearly identified genetic origin. These diseases are also characterised by risk genes, meaning that the people will not necessarily develop the disease, but they have a two or three-fold higher percentage of chances to develop the disease. And again, these risk genes are going to tell us something about the mechanism of the disease that we might use to develop treatment. For example, for Alzheimer's disease, we have genes that are related to neuroinflammation or lipid metabolism. For Parkinson's disease, we find again mutation in the Alpha-synuclein and LRRK2, and in genes that are related also to the immune response. And for ALS, we also have risk gene that has been identified.

Notes

Summary

2m 18s



A very interesting point came out when the position of mutation in the risk gene have been studied. And you can see on this pie that actually very few mutation are present in exons and the majority is present in the introns or intergenic region. The majority are actually located probably in a regulatory region and this affect the expression of this gene rather than the gene product, the protein itself. This is also a very important point to take into account when we design new therapy.

Notes

Summary

4m 43s