Technology Offer

Method of stratifying a subject with polyneuropathy and in vitro method for diagnosing polyneuropathy in a subject

Introduction

Specifically, polyneuropathies (PNPs) denote diseases of multiple peripheral nerves and range among the most common neurological diseases, affecting at least 4% of the middle-age and elderly population. Patients affected by PNPs suffer from progressive sensory and motor impairment and an often painful life-long aggravating disease with an enormous socio-economic impact. The underlying causes of PNPs are very diverse and comprise diabetic, toxic inflammatory/immune-mediated, hereditary, metabolic and vitamin deficiency. Despite comprehensive diagnostic work-up, the underlying cause of PNPs is unclear in many patients (20-30 %). Biopsy of the sensory sural nerve at the lateral ankle is often the final diagnostic step to assess specific causes in human PNP patients, but even biopsy does not lead to a diagnosis in many patients. This could be due to an insufficient depth of analysis of this tissue. Fully exploiting this precious biomaterial for mechanistic understanding and diagnostic potential is especially important to detect treatable causes such as immune mediated neuropathies, which account for up to 10% of the PNPs and are treatable.

Invention

The present invention relates to an *in vitro* method for diagnosing polyneuropathy (PNP) in a subject as well as a method of stratifying a subject with polyneuropathy (PNP). Further, the present invention relates to a method for determining therapeutic treatment of PNP in a subject as well as to the use of any method of the present invention for determining a treatment regime for a subject suffering from PNP. Finally, patients could be categorized into patient clusters identified solely by single cell transcriptomics which hinted towards mechanistic patterning of patients. The inventors thus provide a single cell atlas for the human peripheral nerve in health and PNPs and discover potential for an unbiased diagnostic classification of PNPs.

Advantages of the invention

The inventors identified and spatially validated novel and partially human-specific markers. By combining single nuclei and spatial transcriptomics of human sural nerve biopsies, the inventors provide the first large-scale single cell atlas of human peripheral nerves. Skin biopsy, or a biopsy from any other tissue containing peripheral nerves or liquids, such as blood, CSF, or cellular material comprising nerves, or meningeal biopsies, or cerebrospinal fluid are planned for the future. The present invention enables that PNP patients were categorized into clusters identified by single cell transcriptomics with specific phenotypes beyond existing clinical classification.

Areas of application
Diagnostics, biomarker

Keywords
Polyneuropathy, single cell RNA sequencing

Development Status
Proof of concept

Commercial Opportunity
The technology is offered for in-licensing and co-development

Patent Status
Application filed in Europe

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