

natureOUTLOOK

MULTIPLE SCLEROSIS

1 December 2016 / Vol 540 / Issue No 7631



Cover art: Señor Salme/
Synergy Art

Editorial

Herb Brody, Michelle Grayson, Nick Haines, Richard Hodson, Brian Owens, Jenny Rooke

Art & Design

Mohamed Ashour, Kate Duncan, Wesley Fernandes, Wojtek Urbanek

Production

Matthew Carey, Ian Pope, Karl Smart

Sponsorship

David Bagshaw, Samantha Meyer

Marketing

Nicole Jackson

Project Manager

Anastasia Panoutsou

Art Director

Kelly Buckheit Krause

Publisher

Richard Hughes

Editorial Director,

Partnership Media

Stephen Pincock

Chief Magazine Editor

Helen Pearson

Editor-in-Chief

Philip Campbell

Multiple sclerosis is a devastating disease that induces the body's own immune system to eat away at the central nervous system, slowly robbing patients of their physical mobility. It is also mysterious. Despite years of research, the cause remains elusive, and treatments are few and far between.

Progress is slow, but measurable. The study of clusters of cases in Canada is starting to reveal the complicated interactions between genetics, geography and a common viral infection that may lie behind the disease (see page S4). And new treatments, many based on existing drugs, are starting to show promise for the more debilitating progressive form of the disease, which has until recently been largely ignored and forgotten (S7). Leaders in the field are calling on researchers to take more risks and develop new kinds of clinical trial to test different combinations of drugs to treat progressive multiple sclerosis (S10).

A drastic form of treatment that eliminates a patient's immune system and replaces it with fresh stem cells (S11) is offering hope. But many doctors worry that it is too dangerous for widespread use, and it is already attracting unethical and unlicensed imitators.

Until a blockbuster drug treatment is found, patients have to manage their disease. A variety of diets have been developed, aimed at helping to control the symptoms, and they are now finally getting the scientific scrutiny they deserve, despite the difficulties of applying rigorous clinical-trial standards to eating habits (S13). With perseverance, imagination and a bit of luck, progress on treating and curing multiple sclerosis could soon move faster than ever.

This Outlook has been supported by a grant from F. Hoffmann-La Roche Ltd, which has had no control over the editorial content of this activity.

Brian Owens

Contributing editor

CONTENTS

S2 BIOLOGY

A degenerative affliction

The development of multiple sclerosis

S4 AETIOLOGY

Neighbourhood watch

Clusters of multiple sclerosis cases can help reveal the cause

S7 THERAPIES

Progressive steps

Signs of progress in the search for drug treatments

S10 PERSPECTIVE

Who dares, wins

Bibi Bielekova calls for a radical rethink on drug development

S11 STEM CELLS

Stemming the tide

Can a risky treatment help some people who have multiple sclerosis?

S13 DIET

Changing the recipe

It is harder than it looks to test whether dietary changes can help to treat multiple sclerosis

RELATED ARTICLES

S15 Myeloid cells — targets of medication in multiple sclerosis

Manoj K. Mishra & V. Wee Yong

S28 Transcription factor Nr4a1 couples sympathetic and inflammatory cues in CNS-recruited macrophages to limit neuroinflammation

Iftach Shaked et al.

S35 Proton-gated Ca²⁺-permeable TRP channels damage myelin in conditions mimicking ischaemia

Nicola B. Hamilton, Karolina Kolodziejczyk, Eleni Kougioumtzidou & David Attwell

S40 Interferon- β therapy specifically reduces pathogenic memory B cells in multiple sclerosis patients by inducing a FAS-mediated apoptosis

Fabiana Rizzo et al.

Nature Outlooks are sponsored supplements that aim to stimulate interest and debate around a subject of interest to the sponsor, while satisfying the editorial values of *Nature* and our readers' expectations. The boundaries of sponsor involvement are clearly delineated in the *Nature Outlook* Editorial guidelines available at go.nature.com/e4dwzw

CITING THE OUTLOOK

Cite as a supplement to *Nature*, for example, *Nature* Vol. XXX, No. XXXX Suppl., Sxx–Sxx (2016).

VISIT THE OUTLOOK ONLINE

The *Nature Outlook Multiple Sclerosis* supplement can be found at <http://www.nature.com/nature/outlook/multiple-sclerosis>. It features all newly commissioned content as well as a selection of relevant previously published material.

All featured articles will be freely available for 6 months.

SUBSCRIPTIONS AND CUSTOMER SERVICES

Site licences (www.nature.com/libraries/site_licences): Americas, institutions@nature.com; Asia-Pacific, <http://nature.asia/jp-contact>; Australia/New Zealand, nature@macmillan.com.au; Europe/ROW, institutions@nature.com; India, npgindia@nature.com. Personal subscriptions: UK/Europe/ROW, subscriptions@nature.com; USA/Canada/Latin America, subscriptions@us.nature.com; Japan, <http://nature.asia/jp-contact>; China, <http://nature.asia/china-subscribe>; Korea, www.natureasia.com/ko-kr/subscribe.

CUSTOMER SERVICES

Feedback@nature.com

Copyright © 2016 Macmillan Publishers Ltd. All rights reserved.