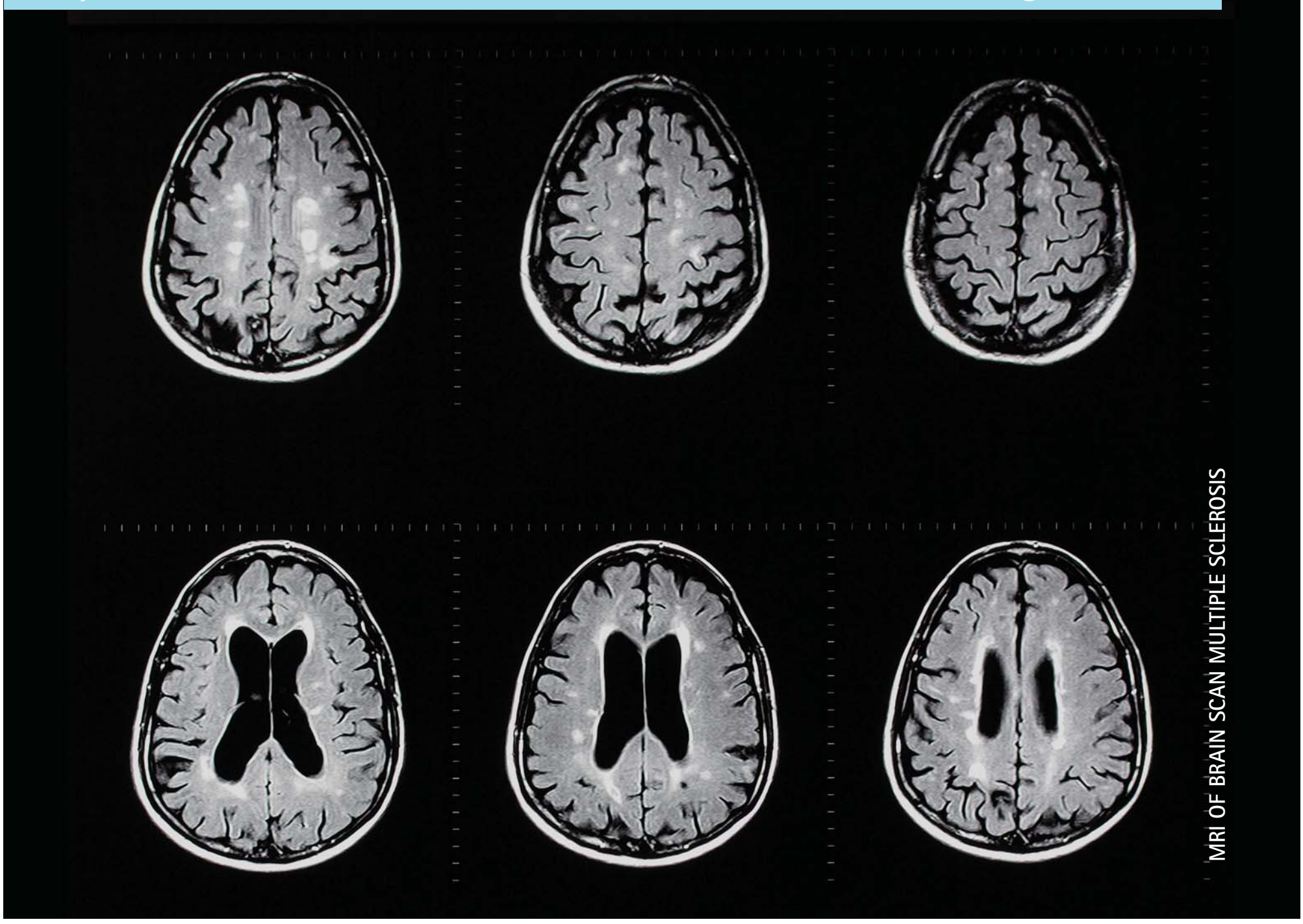
MEDIA PLANET

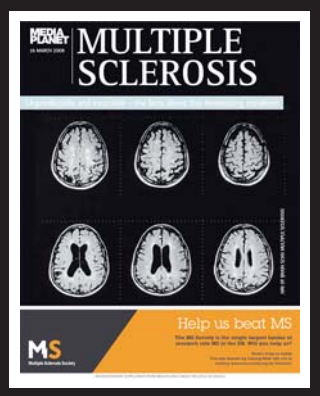
26 MARCH 2008

MULTIPLE SCLEROSIS

Unpredictable and incurable – the facts about this devastating condition



MRI OF BRAIN SCAN MULTIPLE SCLEROSIS



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MULTIPLE SCLEROSIS
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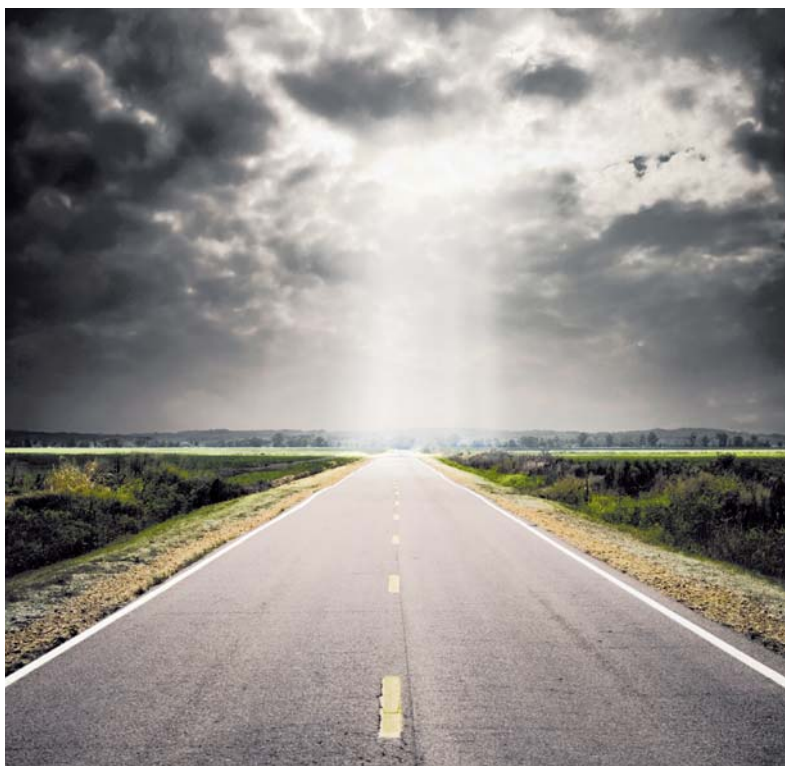
MS research: hope and the opportunity

Multiple sclerosis (MS) is a devastating and incurable neurological condition that affects around 85,000 people in the UK. Usually diagnosed in the 20s and 30s age group, it is a chronic condition that affects three times as many women as men. It is unique in its range of symptoms and unpredictability.



MS can cause grinding fatigue, nerve pain, loss of sight and mobility, depression, loss of memory, mood swings, incontinence, sexual dysfunction and spasticity. The quality of life of people with MS can be very poor. People with more severe forms of MS often rate their lives as effectively worse than death.

MS damages the central nervous system and because of this its symptoms can fluctuate dramatically. Someone can feel fighting fit one day, only to wake unable to see or get out of bed the next. This causes major problems in working life, as a parent, husband, wife, or friend.

You may have two friends with MS, one who runs marathons from time to time and the other confined to their bed, unable to eat, wash or move without assistance. This is the nature of MS.

We know that people with MS are more likely to get divorced, lose their job, to end up in poverty, take their own lives, and to die on average five to ten years earlier than the general population. Living with a chronic long-term condition like MS without care or support is a recipe for becoming isolated, dependent on state benefits and – in the worst cases – written off by life.

Working to beat MS

At the same time, many people with MS battle day in and day out to take it on and fight MS, to try to beat it by staying in work, to try to beat it by staying in the family home, and through the support of their family, friends and others like them.

There is no good time to get diagnosed with MS, but, thanks to advances in our understanding of MS and to developments brought about by medical research, there is a range of therapeutic options now available.

And for the many hundreds of thousands of people across the UK living with MS, research offers the greatest hope for the future.

> "With MS, early diagnosis will be the answer"

As the UK's largest single funder of MS research in the UK, the MS Society is well placed to try to turn this hope into reality. In the past three years we have trebled our annual commitment to MS research. More than £5million will be invested this year, mostly money raised through the support of thousands of volunteers and donors.

The money we contribute adds to a growing pool of MS investment worldwide. The UK government, the pharmaceutical industry and other MS charities from the UK and overseas are putting unprecedented amounts of expertise and effort into beating MS. We all need to work together to ensure that we make the best use of our shared knowledge.

Shedding light on the science

This supplement aims to shed more light on where MS research stands and what lies ahead. Research into MS offers scientists at all levels a massive and complex challenge. While there will never be the money for MS that attracts to cancer and other common conditions, there are passionate, committed researchers working across the world to try to crack MS.

The main drive is always ultimately toward finding a cure and we will continue to devote significant money to this, but there is a need for a measure of realism. The complexity of the condition – it affects the single most complex area of the human body, the central nervous system – means a cure remains a distant prospect.

There is real hope of developing much more effective treatments for people diagnosed with MS. Many MS experts believe that within our lifetimes MS will be a condition that remains long-term but is largely treatable. As an example, many people with diabetes who would have faced losing limbs and even their lives a few decades ago now live relatively normal lives through better drug treatments and management.

With MS it seems likely that early diagnosis and intervention with a combination of drug therapies, physiotherapy and exercise, good diet, counselling and quality social care will be the answer. To put this package together we need to understand the many faces of this enigmatic, devastating disease and the key to this is research.

Help us beat MS

The MS Society is the single largest funder of research into MS in the UK.

Will you help us?

By enabling us to invest in research you could help lead us to better treatments for MS and perhaps, one day, a cure for this devastating condition. This year we have pledged to spend £5.6 million on world-leading research and we urgently need your support.

Please complete the form below and send to: Deborah, Supporter Services, Room 53, The MS Society, FREEPOST LON 12519, London, NW2 2YR

I'll help support the MS Society

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☐ **What is MS** ☐ **Working with MS** ☐ **Just diagnosed**

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MS
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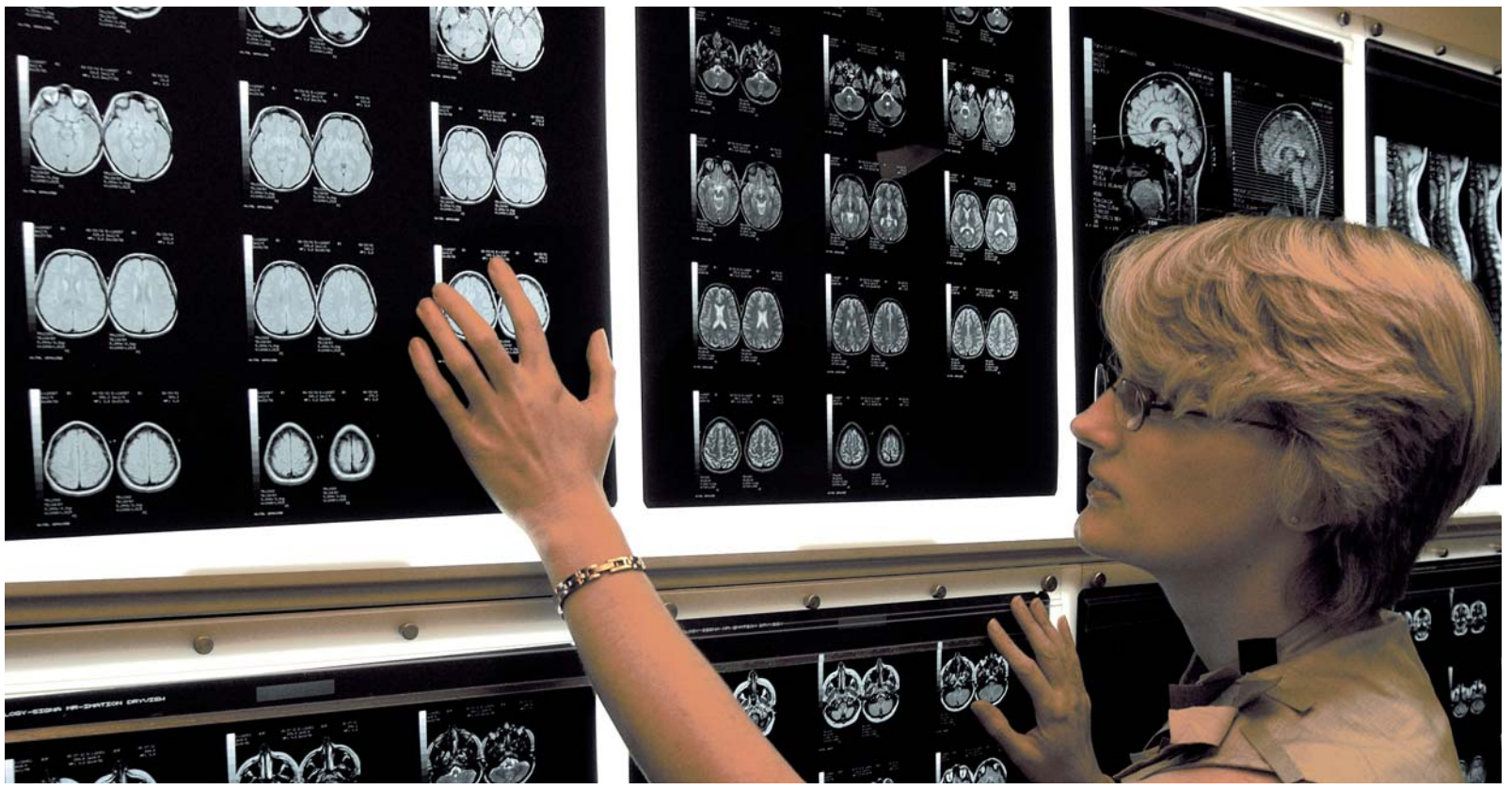
What is multiple sclerosis?



How MS causes damage to the nervous system

To understand what happens in MS you need to understand the basics of the body's central nervous system (the brain and spinal cord). The brain controls bodily activities, such as movement and thought, and the spinal cord is the main pathway for these messages between the body and the brain.

Surrounding and protecting the nerve fibres of the central nervous system is an insulating substance called myelin, which helps messages travel quickly and smoothly from the brain to the rest of the body.

MS is an autoimmune condition. This means that the immune system, which normally helps to fight off infections, mistakes its own tissue for a foreign body and attacks it. In MS the immune system attacks the myelin surrounding the nerve fibres. It also attacks myelin-making cells, known as oligodendrocytes. The process of stripping myelin from nerve fibres leaves scars, known as lesions, plaques, or sclerosis. Magnetic resonance imaging (MRI) scanning can show some of the damage MS causes.

Without this layer of insulation, the nerve fibres do not work properly. At first they may simply not be able to transmit signals as fast as they should. This can make movement slow or clumsy or can reduce a person's ability to think clearly. Initially the body is able to replace the damaged myelin, a process known as remyelination, but over time this repair process fails. In time the nerve fibres themselves become damaged and nerves begin to fail to conduct impulses.

Throughout the course of MS nerve fibres start to degenerate and, as time goes on, myelin damage becomes more extensive. This loss becomes more noticeable in the symptoms a person experiences. It is this damage and ultimate loss of nerve fibres, similar in effect to an electrical wire gradually wearing away with time, which means the messages no longer get through. This process is thought to be responsible for the slow progressive increase in disability experienced by people with progressive forms of MS.

> "There is an underlying increase in disability with time"

To clear up a few common misconceptions, it's worth pointing out that – although incurable – MS is not a terminal illness. Like diabetes, it's known as a 'chronic condition' so it needs to be managed for life. Most people with MS live a normal life span, with perhaps a five to ten year reduction in life expectancy. This difference is being eroded with advances in medical management.

MS is also not a muscle wasting disease. While its effects on the central nervous system can cause muscle damage through lack of use, the same effect can be seen if your leg is in plaster for six weeks after a break. Physiotherapy and other types of care can help with this.

Different types of MS and future prognosis

Health care professionals will often talk about different types of MS, which give a broad picture of how someone's MS is likely to behave. These may give only a general outlook, but can be helpful to understand when trying to explain MS to others.

Relapsing remitting MS

Most people with MS (around 60 per cent) are first diagnosed with relapsing remitting MS. This means they experience a relapse or flare up of symptoms (also known as an attack or exacerbation) followed by remission (a period of recovery). A relapse is usually defined as the appearance of new symptoms, or the return of old symptoms, for a period of 24 hours or more, at least 30 days since the start of any previous relapse.

Relapses can take a few days to develop and can last for days, weeks or months. Symptoms can be mild or severe. In relapsing remitting MS, symptoms can disappear completely during remissions.

All the current licensed MS treatments in the UK are for relapsing remitting MS. You can read more about these later in the supplement.

Secondary progressive MS

Many people who start out with relapsing remitting MS later develop a form that is known as secondary progressive MS and around 40 per cent of people with MS live with this form of the condition. In secondary progressive MS, symptoms do not go away completely after a relapse and there is an underlying increase in disability over time.

The current disease modifying drugs for MS may be used in people with secondary progressive MS who continue to experience relapses, but specific treatments for this type of MS have not yet been developed.

People with secondary progressive MS are encouraged to look at other types of therapy – including physiotherapy, counselling, better diet and more – to manage their symptoms. The lack of a drug option does not mean people with secondary progressive MS should assume there is nothing out there for them.

Primary progressive MS

Primary progressive MS is a relatively unusual form of MS which tends to be diagnosed in older people and affects men and women equally. From the outset those with primary progressive MS experience steadily worsening symptoms and an increase in disability. Symptoms may level off for a time, or may continue to worsen. Approximately 10 to 15 per cent of people with MS have the primary progressive form and there are no licensed treatments. Therapies to relieve symptoms as well as care from a multi-disciplinary team of health profesionals are very important for the long-term care of people with this type of MS.

'Benign' MS

People with relapsing remitting MS who only have a small number of relapses, followed by a complete recovery, may be described as having benign MS. It is only possible to make a diagnosis of benign MS once a person has experienced little or no disability for a period of 10 to 15 years and around 10 per cent of people with MS have a benign form. However, a diagnosis of benign MS does not mean they will be free of problems; a relapse may occasionally occur after many years in which the MS has been inactive.

SYMPTOMS OF MS

MS can affect people very differently depending on where and how damage takes place and one of the most frustrating aspects of the condition is its unpredictability – not knowing what symptoms may arrive, when, or how long they will last. A lot of information about MS can only give an idea of averages, looking at how it affects large numbers of people in general.

Common symptoms include:

- fatigue – an overwhelming sense of tiredness making physical or mental activity dif ficult and, for some, impossible
- balance problems and vertigo – walking difficulties, prob lems with coordination
- visual problems – blurred or double vision, temporary loss of sight in one eye or both
- numbness or tingling – commonly in the hands or feet
- pain – sometimes mild, sometimes severe
- loss of muscle strength and dexterity
- stiffness and spasms – tightening or rigidity in particular muscle groups
- sexual dysfunction
- anxiety, depression or mood swings
- cognitive problems – difficulty with memory and concentration
- speech problems – slurring, slowing of speech, or changes in pitch or tone
- incontinence – a lack of control over bladder or bowel functions

Living with MS

Taking part in clinical trials or using new MS treatments can make a huge difference to people's lives. There are a range of treatments on offer, but here two people with MS speak about their experiences over the past two years.

Karen Ayres was diagnosed with multiple sclerosis in 2002, aged 24. Shortly after her diagnosis Karen agreed to take part in a pioneering drugs trial which turned her life around.

"My symptoms started when I fell over in a nightclub, I laughed about it at the time but the following day I experienced a loss of sensation on one side of my body which gradually developed into a heavy, sluggish feeling.

"A few weeks later I could barely walk and I was admitted to hospital where tests proved inconclusive. I was discharged but three days later collapsed unconscious; when I woke up in hospital I was completely paralysed from the neck down.

"I was quickly transferred to the Walton Centre, a neurological hospital in Liverpool, where I was diagnosed with multiple sclerosis. That's when I met neurologist Dr Boggild who asked me to take part in a pioneering new drugs trial. I agreed immediately and started the treatment.

"I received the chemotherapy drug Mitoxantrone by drip for six months and then a daily injection of the drug Copaxone. While taking the treatment, I completely regained the use of my body.

"Six years later, the drugs trial has turned my life around. I now inject a daily dose of Copaxone, it's something I have come to accept and doesn't interfere with my lifestyle. Probably the most remarkable thing is that I haven't had a single relapse.

"I am so thankful I was introduced to these drugs and that I am under the care of Dr Boggild. Copaxone isn't suitable for everyone with multiple sclerosis, but taking part in the trial has proved to be the best thing I have ever done."

Caroline Haynes, 44, can trace the first symptoms of MS back to 1993 when she suffered problems with her eyesight. Then a bladder collapse in 2000 and feelings of depression greatly affected her confidence and her performance at work as a Hotel Manager.

It was after an optician's appointment when Caroline was referred to a neurologist that lesions on her brain and spine led to a diagnosis of MS in November 2001.

"I'd had three vicious relapses before I was offered the chance to take part in a two and a half year Tysabri clinical trial at Kings College hospital under Dr Eli Silber. I started taking the drug and soon realised I actually felt good – a lot of the symptoms had stopped like the tingling, the numbness, the pins and needles, the awful burning sensation, the aches and pains that you get in your legs, in your arms. They all disappeared.

"In fact for two and a half years, I was completely in remission. All the MRI scans I had during the trial showed that nothing had changed but when the trial stopped, I had a relapse. I realised I couldn't live without the drug and I wanted it back.

▲ Karen Ayres

"Other treatments for MS can involve daily injections but I hate needles. Having the drugs by infusion suits my lifestyle, if I had the choice between going into hospital for an infusion or injecting the drugs at home – I would always opt for the hospital; you know it's being done properly.

"There are risks associated with Tysabri but they've been very well documented and explained to us. I think you just have to make an informed decision; I fortunately have had a great experience with Tysabri and will not look back." NICE has now agreed to make Tysabri available to those people with MS who need it as a result of the clinical trials process in which Caroline was involved.

MULTIPLE SCLEROSIS Modifying drugs

Current MS disease modifying drugs explained

The current range of disease modifying drugs decrease the rate and severity of MS relapses and there are also drugs to provide relief from symptoms. A range of more powerful drugs are in development, bringing a greater need to balance the benefits and risks of treatments with potential side effects.

MS research is opening up new fields of therapies and we will look at some of those in more depth later, but for many people with MS there is now a genuine range of treatment options at the point of diagnosis and beyond.

Disease modifying drugs

The core MS therapies in use today are the disease modifying drugs (DMDs). Although not a cure, they act to reduce the number of MS relapses by around a third. They may also reduce the severity of relapses. Whether DMDs are able to slow the rate of disability progression in the long term is still open to question.

The four main DMDs are the beta-interferons (Avonex, Rebif and Betaferon) and glatiramer acetate (Copaxone). They are all given by injection, at home, either under the skin or into the muscle. Injections are daily, every other day, three times a week, or weekly, depending on which drug is used.

Interferons are substances produced by the body to regulate the immune system. The beta-interferon drugs work by diminishing the activity of the specific white blood cells thereby reducing the potential for autoimmune attack of the myelin sheath. Glatiramer works to modify the immune process that causes MS.

Some research suggests that the earlier these drugs are used, the better the potential long-term benefits. This reinforces the importance of early diagnosis of multiple sclerosis, and the need for someone with multiple sclerosis to be referred to a neurologist or MS nurse at the earliest appropriate opportunity.

These four drugs are available to adults on the NHS for those who meet certain criteria set down by the Association of British Neurologists (ABN). The NHS has agreed to pay for the drugs for anyone who meets these criteria, under a scheme known as the 'Risk-sharing Scheme'.

Another disease modifying drug, natalizumab (Tysabri) is not part of the Risk-sharing Scheme, but is approved for use on the NHS for people with 'severe, highly-active relapsing remitting MS'. This is the only MS drug to have been judged cost effective by the National Institute of Health and Clinical Excellence (NICE).

In two-year clinical trials Tysabri reduced the relapse rate in people with MS by around two-thirds. It also showed promise against long-term disability progression. It works in a different way to the other DMDs, preventing inflammatory immune cells from entering the central nervous system.

Tysabri, which is given by a once-monthly infusion, has demonstrated better treatment results but is not suitable for everyone with relapsing remitting MS. While Tysabri is very effective there are also some rare but very serious side effects associated with this drug. People living with MS and health professionals have a challenging time ahead in working out how to assess risks and decide on the best treatment.

Steroids and mitoxantrone

Among a range of other non-licensed treatments used in MS are steroids and a powerful immune suppressant called mitoxantrone.

Steroids are commonly used to treat an attack of neurological symptoms – either the first episode, or later relapses. Although they do not alter the course of the condition, steroids reduce inflammation in the central nervous system and speed up recovery. They can have some unpleasant side effects but are a relatively safe option. It's important to note that these steroids (known as 'corticosteroids') are sometimes used by athletes to build muscle.

Mitoxantrone is not licensed for MS but is available for use. It is most often used for people with aggressive relapsing remitting or secondary progressive MS. Mitoxantrone is a powerful immune system suppressant used to treat some forms of cancer. It appears to be most effective where relapses are a key feature of a person's MS. It is often used for people who continue to have severe relapses despite treatment with beta interferon or Copaxone.

Clinical trials suggest mitoxantrone can reduce the frequency of relapses in relapsing types of MS by up to 80 per cent, although it is not beneficial for everybody. Treatment with mitoxantrone is usually limited to two to three years in order to prevent potential toxic effects on the heart. Several studies are looking at mitoxantrone in combination with other treatments, such as Copaxone.

SATIVEX

Sativex is a cannabis based medicine that is currently taken as an oral spray by around 1,200 people with MS in the UK. This drug can help to relieve pain, spasticity, bladder problems and problems with sleeping. It is approved as a prescription medicine in Canada and is currently undergoing late stage clinical development in Europe and the United States.

Doctors in the UK can prescribe Sativex for individual patients if they believe it will be of benefit to people who have not gained adequate relief from existing treatments, but the decision as to whether or not to fund the drug is at the discretion of the Primary Care Trust.

The MS Risk-sharing Scheme

The drugs beta interferon and glatiramer acetate were first made available in the UK in the 1990s but they rapidly became synonymous with the 'postcode lottery' in the health service. People with MS who needed them were being turned away on grounds of cost.

NICE stepped in and ruled that although they worked, they were not a cost-effective use of NHS resources.

The MS Society and other MS charities contested the decision and, as a result, the Department of Health launched the Risk-sharing Scheme in 2002. This was a statutory direction to ensure that anyone with MS who met the Association of British Neurologists' criteria should get the drugs. It still stands.

Although the scheme is not a clinical trial, a core part of it is the monitoring of a cohort of 5,000 people with MS to evaluate the cost-effectiveness of the drugs over 10 years. The MS Trust is responsible for administering the scheme, which is a partnership between government, the pharmaceutical industry and MS charities.

> "The Risk-sharing Scheme has seen the establishment of about 100 MS prescribing centres"

The first results from this cohort, based on two full years of data, are due to be published in a peer-reviewed scientific journal in mid-2008.

The theory behind risk-sharing is that if the drugs do not perform according to expectations, the price of the drugs will alter to reflect this. In effect the NHS and relevant pharmaceutical companies are sharing the financial risk over the provision of the drugs.

The Risk-sharing Scheme has also seen the establishment of nearly 100 MS prescribing centres across the UK and the introduction of around 200 MS nurses to the NHS. These expert nurses are part funded by the NHS and part by the pharmaceutical companies. Around 100 of the nurses depend on charitable funding from the MS Society.

What causes MS?

The causes of MS remain a mystery. While a number of pieces of the jigsaw have fallen into place in recent years, there is still a long way to go before we can say with any certainty why some people get MS and others don't and many questions remain.

Genes – does MS run in the family?
Genes play only a small part in determining who gets MS. For example, if one twin of an identical pair has MS there is only a 30 per cent chance that the other twin will also develop it. If genes were wholly responsible this would be 100 per cent. This means certain genes can make you more susceptible, but they are far from the full story.

Around one in every 800 people in the UK develops MS. Where one parent has MS the chances of a child developing MS are higher, but still very small: about one in 50. Furthermore, the severity of MS progression within families can vary, suggesting other factors also play a part.

Rates in women on the increase
In the past few decades there has been a significant increase in the rate of relapsing remitting MS among women while the rate among men has stayed the same. A recent study found that the female to male ratio has increased from around one to one (reported in Scotland in the 1950s) to more than three women for every man. This has happened in too short a time for it to be explained by genetic changes but it is not clear what is actually responsible.

Is MS triggered by a virus?
MS can occur in geographical clusters, steeply, before falling again over time. More than 20 viruses have been implicated as having some role to play in MS, including the Epstein-Barr virus which causes glandular fever, but none decisively. It is important to note, however, that these viruses are common in the general population and do not cause MS in themselves.

The higher the latitude, the higher the risk
Geography has a strong influence on rates of MS. In Scotland and Northern Ireland, rates appear to be twice as high as in England, and the further you are from the equator, the more likely you are to be affected. The UK, Scandinavia, Southern Australia and Canada have much higher rates of MS than places like Ecuador and Malaysia where it is almost unheard of.

> "A number of studies have thrown up contradictory results"

When people migrate from countries with a low risk of MS to somewhere with high risk as adults, they retain a low risk of developing MS. But if they migrate as children or adolescents, their risk increases. So, for example, people from Pakistan and India who moved to England before the age of 15 have a greater risk of acquiring multiple sclerosis than those who moved after that age. First-generation African-Caribbean immigrants to the UK have a much lower incidence of MS than second-generation immigrants (i.e. their children). This suggests that where you live as a child and the environment you are exposed to play an important role.

Diet and MS
There are claims that diet is a factor in susceptibility to MS and a number of studies have looked at a possible connection between what people eat and MS. One early study found that there were higher numbers of people with MS living in rural regions than on the coast. Investigations showed coastal dwellers ate more fish and consumed less saturated fat, but a number of studies since then have thrown up a range of contradictory results and there is no clear answer.

Sunlight and vitamin D
Another theory is that vitamin D deficiency can cause MS. Vitamin D is obtained from the diet and made in the body after exposure to sunlight. This is consistent with the higher prevalence of MS in northern countries, where the winter sun is not strong enough to produce adequate amounts of vitamin D and so there is some evidence to suggest that vitamin D may play a protective role against developing MS.

Coming soon – the MS Society UK MS Register

The MS Society has estimated that there are at least 85,000 with MS in the UK, but the simple fact is that no-one is sure.

As a result, 2008 will see the launch of the MS Society UK MS Register. This will initially be a pilot project in a number of regions but will lead to the first attempt to establish the extent of MS nationwide.

This isn't just a question of wanting to know for the sake of it. Instead, there is a huge appetite to know for a number of practical reasons relating to research, to clinical trials, and to health and social care service provision.

In the first place MS is an expensive condition. From the drugs available, through to the impact on the economy from people losing the ability to work, the need to claim benefits and more, MS has a range of social and economic impacts. Only by knowing how many people it is affecting and where, can local and national government allocate resources effectively.

MS researchers are always keen to know more about the prevalence and incidence of MS. The more they know about its patterns, its progression and long-term prognosis, the better they can direct avenues of investigation. Understanding MS is the key to beating it.

The MS Society UK MS Register will seek to answer these questions when it is formally launched later in 2008.

Work is underway to ensure that the Register delivers effective data and that the personal details of everyone taking part are fully protected. With the right safeguards and methodology in place the benefits for people with MS could be significant.

Childhood MS – diagnosis and treatment

MS has traditionally been thought of as an adult condition, but it is now becoming apparent that children and teenagers can also be susceptible. Of the estimated 85,000 people with MS in the UK, perhaps as many as five per cent will develop MS before the age of 16 – that's up to 4,250 young people.

So, although MS is not common in children, it has been known to affect children as young as two years old and there are hundreds, possibly thousands, of children living with a largely unrecognised condition.

Children can be affected with many of the same symptoms as adults such as fatigue, problems with balance or vision, stiffness and spasms, anxiety, depression or mood swings, speech problems and incontinence. Cognitive problems – having difficulty with memory and concentration – may be more common in children with MS than in adults, an issue which can affect school or university studies if the right support and adjustments are not made available.

MS is a condition that affects the whole family. It can affect communication, relationships and daily interactions. Children may also exhibit a range of emotions and behaviours such as aggression, denial, depression and anxiety as a reaction to the diagnosis and brothers, sisters and parents can find it just as difficult to adapt to life with a long-term condition.

> "Like in adults, MS in children is difficult to diagnose with no single test"

Like in adults, MS in children is difficult to diagnose, with no single definitive test – and the difficulties can be amplified with children. Symptoms that are mild and quickly pass might be missed or not reported by children themselves; even more obvious or prolonged symptoms may be put down to other conditions more common in children.

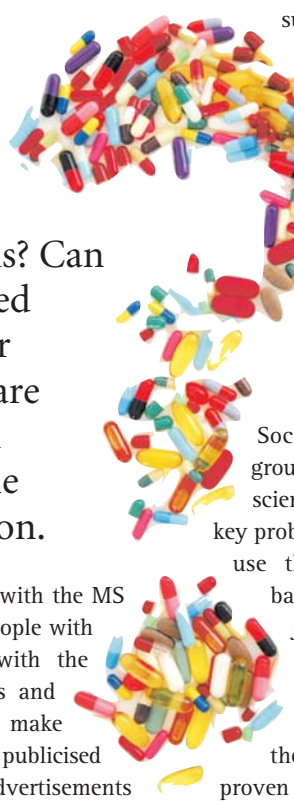
A diagnosis of MS normally requires two or more attacks of symptoms, at least a month apart, but second attacks, if they ever happen, can be months or years away, so diagnosing MS from the first symptoms is usually not possible. Meanwhile, the uncertain wait, for child and family, continues. MS-like symptoms can turn in to many other things or nothing at all, and although with hindsight many adults can trace the origins of the condition back to their childhood, many other people may indeed have just a single attack of neurological symptoms, which never return.

MS is difficult to predict and varies from person to person, so saying exactly how it will affect each child is not possible. Almost all children develop relapsing remitting MS, with periods of good, if unpredictable, recovery. Some children can be more severely affected, but progressive forms of the condition are rare in children.

Many drug treatments used for MS are not licensed specifically for the condition and are even less likely to be licensed specifically for children. So drugs are commonly prescribed on a 'named-patient' basis, where individual prescriber and patient agree to the possible risks of using a drug not licensed for MS. But though doctors can tailor appropriate doses for children and theoretically prescribe in the same way as for adults, access to the 'disease modifying drugs' (beta interferons and Copaxone) can be delayed by arguments over funding.

Talking sense about science

Could goat's blood cure multiple sclerosis? Can heavy snoring cause Alzheimer's? Does red wine protect you against lung cancer…or increase your risk of bowel cancer? And are super-foods still super? Developments in science and medicine frequently make the news headlines and enter public discussion.



When the subject of these reports are 'cures' or 'miracle treatments' for chronic diseases like multiple sclerosis – for which there is currently no cure – affected people and those concerned about them need to know the 'facts' behind the headlines and what it means for them.

Sense About Science is a registered charity that responds to the misrepresentation of science and scientific evidence on issues that matter to society. We have been working with the MS Society to help equip people with neurological diseases with the tools, scientific insights and reasoning they need to make sense of claims that are publicised in the media and in advertisements online.

Is it evidence-based?

Evidence-based medicines are those that are rigorously assessed to make sure that they are both safe and effective. Assessing medicines and treatments in this way safeguards patients from fraudulent and potentially very damaging "treatments" on offer. From our discussions with the MS Society, other patient groups, and with doctors and scientists, we identified some key problems that lead people to use therapies that are not based on rigorous and objective evidence from research. Among these is the problem that some people will buy into therapies because no proven alternative exists; whilst others are misled into believing that marketed therapies are evidence-based.

But rather than offering "patient choice", therapies that sell hope without scientific evidence to back up their claims can cause real harm, mislead and misinform. So how can people judge which claims should be taken seriously? Which treatments are scientifically valid, and which have not been checked by other scientists?

In the first place, it is useful to know that there is a system called peer review, used by scientists to decide which research results appear valid. Here, scientific research is subjected to scrutiny by other independent experts (peers) before they are published. Over one million papers about scientific research are published in scientific journals worldwide annually. It is important to know whether one set of results is reproducible and will stand up to further testing. However, many of the claims that are in the newspapers, magazines and on the internet have not been published in a peer-reviewed journal, which means that other scientists can't check them. Unpublished research may be just an opinion and is more likely to be flawed, so decisions about safety or health benefits cannot be based upon it.

> "Many of the claims have never been published in scientific journals"

The status of research results is as important as the findings themselves. Peer review is an essential arbiter of scientific quality and begins the process of other scientists considering the size and approach of the study and where it sits in a wider body of evidence. With so many "miracle-cure" stories flying about in the press, no matter how compelling or exciting new scientific or medical research is, always ask whether it has been peer-reviewed – and if not, why not?

What lies ahead – future MS therapies

A range of potential therapies for multiple sclerosis (MS) are working their way through the clinical trial pipeline at the moment. Pharmaceutical companies are now exploring treatments focusing on different stages of the condition.

▲ Basic laboratory research increases our understanding of how the body works and how it changes in conditions like MS.

There is now a strong focus on development of oral therapies as currently all the treatments for relapsing remitting MS rely on injections. Therapies which reduce long-term disability progression are much needed and are consequently receiving increasing research attention. There is also a considerable unmet need for treatments and therapies to relieve the numerous and often distressing symptoms which people with MS experience.

Basic laboratory research increases our understanding of how the body works and how it changes in conditions like MS. When this work identifies useful targets for treatment and once substantial tests from a laboratory indicate a drug or therapy is safe, it is allowed to enter clinical trials where it is tested on people. Clinical trials are the only way to show if a new therapy is safe, effective and better than what is currently available. As a rough guide, a treatment in phase II trials is still probably five or more years away from being available, if all results continue to remain positive. A drug or therapy in phase III trials may be only three or four years away, pending regulatory approval. But all this can change and there is no easy way to predict time from trials to availability.

Some potential therapies which are currently being trialled are discussed below, however there is in-depth information about many more potential treatments and trial results on the MS Society's website www.mssociety.org.uk.

Oral therapies are particularly desirable as they are potentially easier for people with MS to use as a long term therapy, avoiding injections and associated side effects such as injection site reactions.

is an oral therapy which is effective against certain immune cells in the body which are thought to be mis-directed in MS to attack myelin. It also has a well established safety record in its treatment of other conditions.

Three studies to date in people with both relapsing remitting and progressive forms of MS have indicated that Cladribine may be able to reduce the number and size of MS lesions (areas of damage in the central nervous system of people with MS), as well as reduce relapse rate and slow disability progression.

Two two-year clinical trials of oral Cladribine are now underway, looking at it as a sole therapy and in conjunction with beta interferon. One of the trials is headed by chief investigator Professor Gavin Giovannoni from Queen Mary University London.

Prof Giovannoni says he believes Cladribine has potential to revolutionise current therapy methods available to people with MS.

"The main advantage of oral Cladribine is that it is administered orally for only 10 or 20 days per year. If oral Cladribine is shown to be effective and safe, intermittent oral dosing will provide a more convenient alternative to the current injectable therapies and will improve adherence to therapy." The results of the trial are expected in 2009.

Other oral treatments for relapsing remitting MS which effect the immune system include Fingolimod, which has shown more than a 50 per cent reduction in relapse rates compared to a placebo, and Laquinimod which has shown a 40 per cent drop in the number of MS lesions, compared to a placebo as measured by MRI. Phase III trials are currently underway for both these therapies.

A number of pharmaceutical companies are also carrying out phase II and III trials into oral versions of the recently licensed drug Tysabri, which is currently only available as an intravenous infusion given once every four weeks.

In terms of preventing progressive disability there are several promising agents in late stage clinical trials. The novel cancer and rheumatoid arthritis drug Rituximab has also shown benefits when administered to people with MS and a large-scale clinical trial of Rituximab is ongoing in people with primary progressive MS

Campath is licensed in the UK for the treatment of a type of leukaemia. It is currently being tested in clinical trials for the treatment of relapsing remitting MS. It is given as an intravenous infusion and works by suppressing certain immune cells.

In relapsing remitting MS, first year results from a phase II clinical trial in people who had been newly diagnosed showed at least a 74 per cent reduction in the risk of relapse, when compared to people treated with beta interferon. However, study results to date also show it is able to reduce disability accumulation by more than 70 per cent over three years in people with relapsing remitting, MS compared to beta interferon therapies. Unfortunately Campath has not been shown to be effective at reducing disability progression for people who have already developed secondary progressive MS.

> "It can be difficult to judge how beneficial a treatment will be for an individual"

Two large phase III clinical trials of Campath are now underway.

There are benefits and risks associated with all therapies and these need to be carefully considered before any treatments are begun. MS is an extremely unpredictable condition and it is difficult to say how and when any individual will be affected. It can therefore be difficult to judge how beneficial a treatment will be for an individual.

It is important to consider that the therapies being trialed for MS have only been researched and studied for a relatively short period of time. The field of MS research is relatively young and treatments only became available around ten years ago. People with a long term condition like MS are potentially likely to be taking these drugs over many years and it is important that they are given as much information as possible about the effects of these drugs so that they can make informed decisions about their benefits and risks.

While world class research into treatments for MS continues, one of the most important issues that affects the quality of everyday life for people with MS is living with their unpredictable and often distressing symptoms.

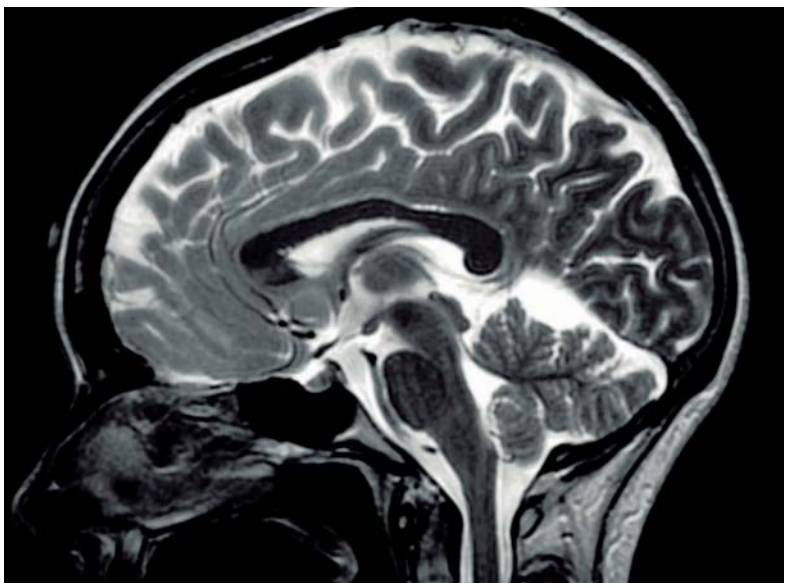
The MS Society has begun a new initiative to fund research into symptom relief and has committed £2.5million over the next three years to fund projects in this vital area.

MS can cause a wide variety of symptoms and, to date, symptom relief is an area of research which has been under-explored. Research projects focusing on pain, fatigue, depression and many other symptoms are currently underway and it is hoped that ultimately therapies and treatments might be designed which allow people affected by MS to have more control over their symptoms and a better quality of life. More information about symptom relief research projects can be found at www.mssociety.org.uk.

The future of MS therapies looks promising. There are currently more than 50 ongoing trials for MS treatments involving more than 30 different agents and there is promise that more effective, more convenient therapies will soon be available.

Protecting nerves – a new approach to fighting MS

One of the most distressing aspects of MS is the progressive disability that the majority of people with the condition experience over time. This has been shown to be due to damage and loss of nerve fibres from the earliest stages of the condition.



Current licensed disease modifying drugs do not have any proven benefit for people with progressive forms of MS and there are a limited number of research projects and clinical trials to develop therapies for treating this form of the disease.

The MS Society has therefore prioritised the funding of research investigating nerve damage, repair and protection and steps have been taken to address the lack of clinical trials investigating the damage and loss of nerve fibres (neurodegeneration) and progressive forms of MS. As well as providing funding for two clinical trials investigating drug treatments which might be able to protect nerve fibres, more than £3 million has been invested in new research centres in Cambridge and Edinburgh, which are investigating the use of adult stem cells along with other techniques to protect nerve fibres and promote myelin growth.

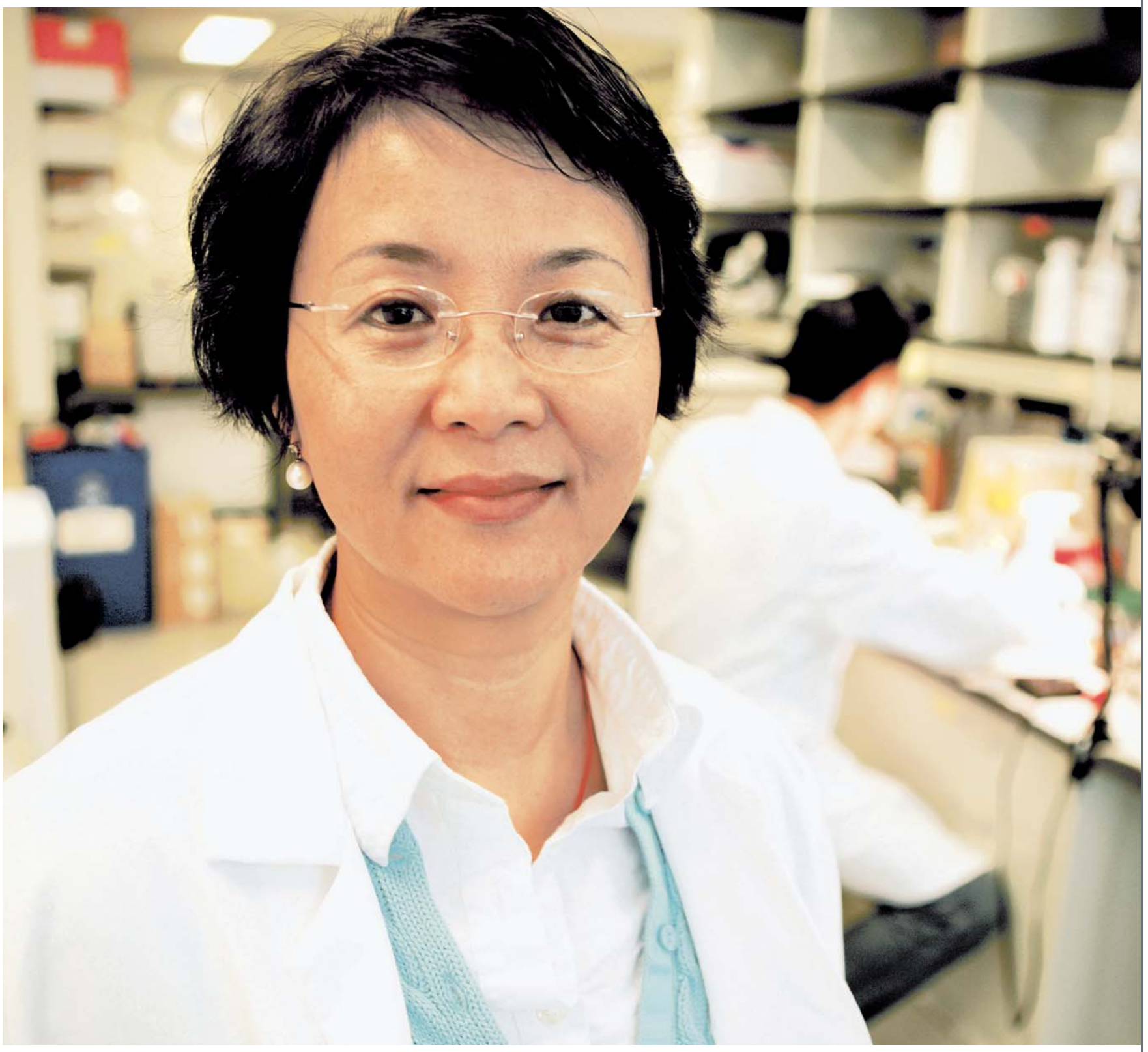
The mission for the MS Society Cambridge Centre for Myelin Repair is to develop new therapies for promoting myelin repair and preventing nerve fibre loss in people with MS. The centre unites existing expertise in stem cells, brain repair and MS in a focused programme of work. Professor Robin Franklin, who heads up the centre, believes the research at the heart of the £1.2 million project could one day change the lives of thousands of people with MS.

"As with all new and challenging research projects, the time scales involved are long term," he admitted. "But these treatments involve working with fundamental components of the central nervous system and we cannot cut corners. In the long run, this research shows great promise and I am confident the wait will prove to be worthwhile."

The MS Society Edinburgh Centre for Translational Research based at Edinburgh Royal Infirmary, is an exciting and innovative development in the world of MS research. The structure of the Translational Research Centre, directed by Professor Charles ffrench-Constant, means that basic science research can take place alongside clinical work, with the added benefit of links with local MS outpatient services. It is a more streamlined approach to research involving active collaboration with the Cambridge Centre for Myelin Repair to share knowledge and speed the journey from bench to bedside. It is also hoped that the Centre will encourage new methodologies and practices which will spark real progress in treating MS.

In an effort to discover further treatments which might benefit people with progressive forms of MS, the MS Society has been in discussion with a number of leading neurologists, clinicians, basic scientists and statisticians in the MS field who are interested in developing therapies to protect nerves and has formed an MS Clinical Trials Network (CTN). The CTN is currently in the planning stages of a project to assess the benefits of certain interventions for the treatment of progressive MS.

While we are several years away from treatments for progressive forms of MS, this, along with other leading MS research, offers real hope for future therapies and for people living with MS.



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