

Guillain-Barre Syndrome

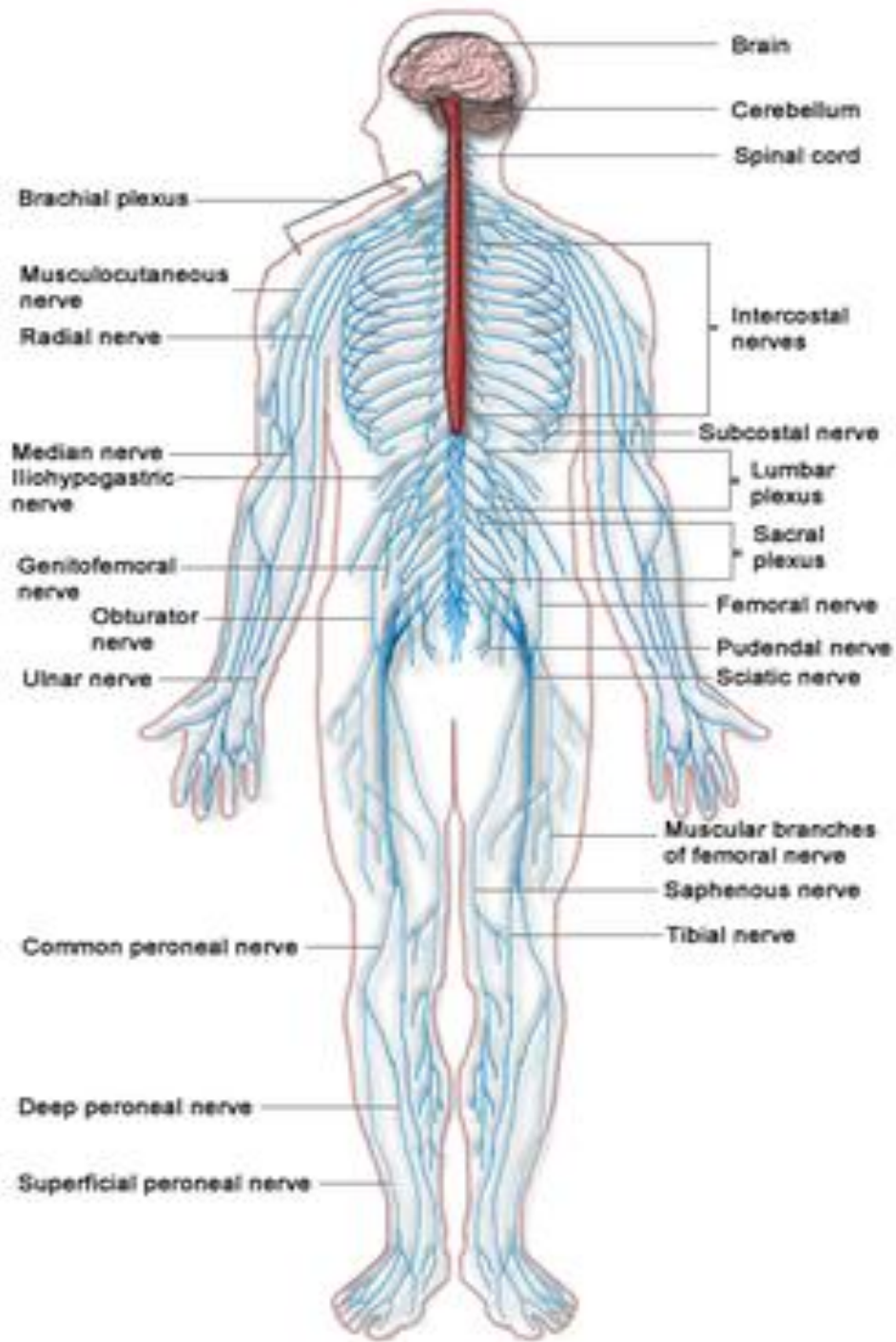
A brief overview

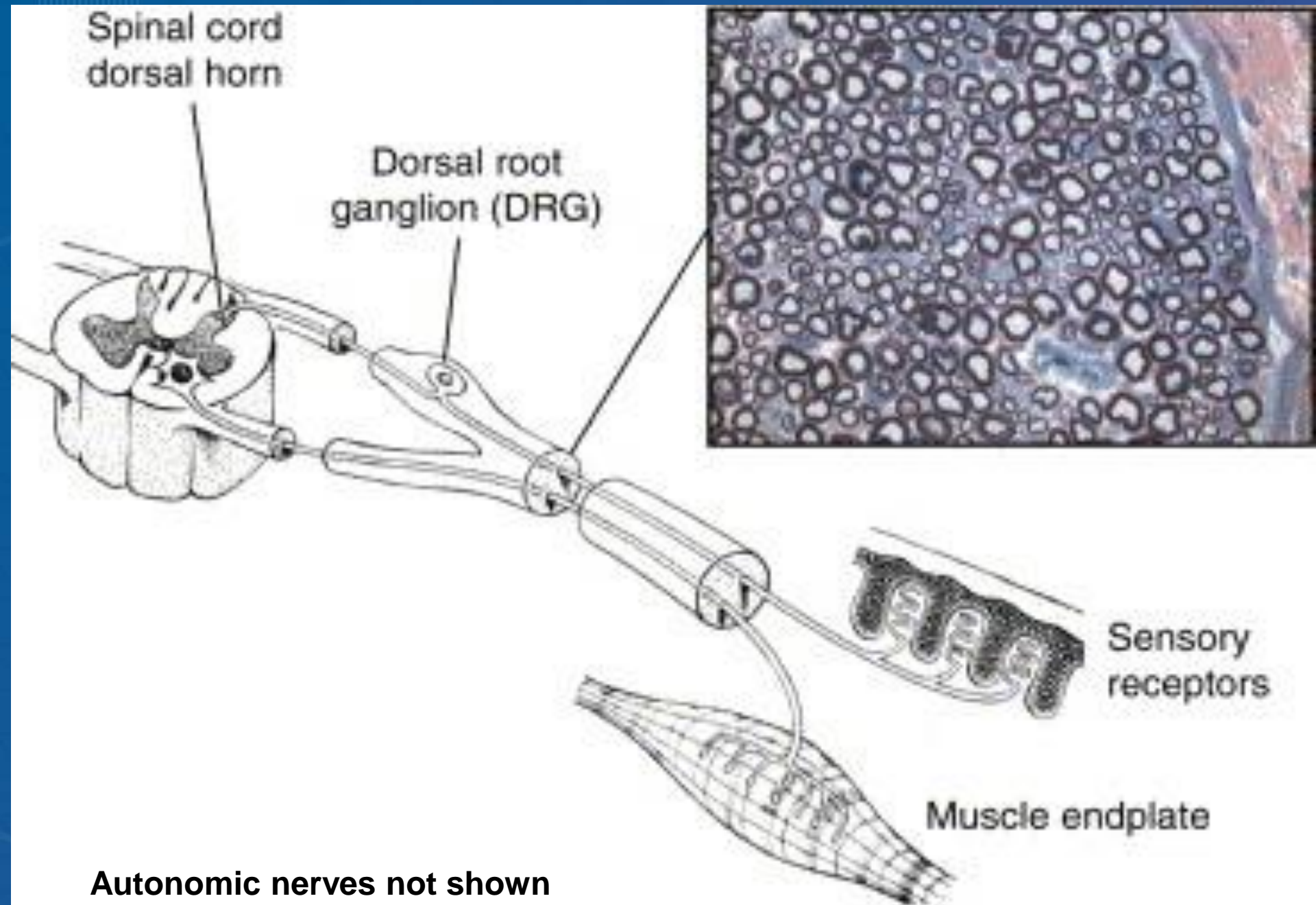
Gareth J. Parry
University of Minnesota
Consultant Neurologist
Wellington Hospital

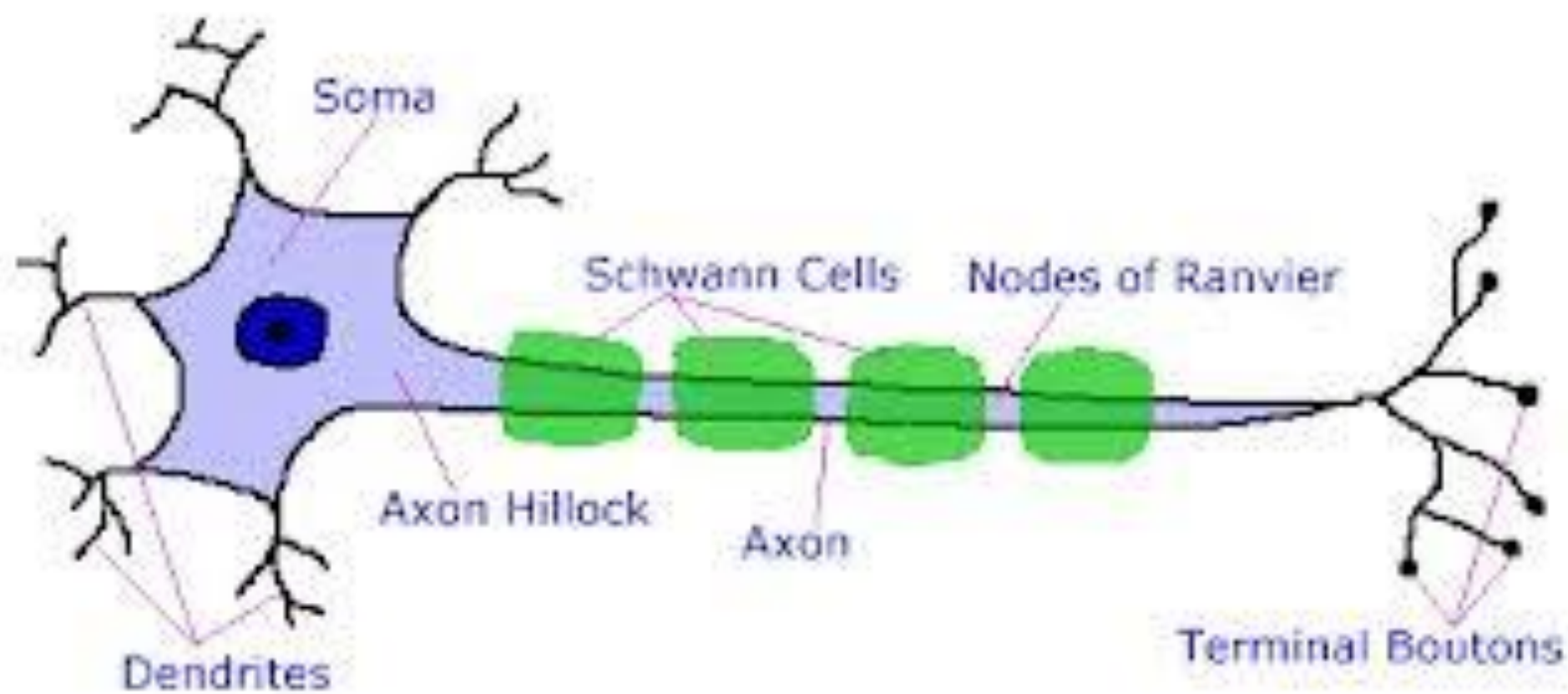
- What is GBS?
- What causes GBS?
- How does GBS affect you?
- How is GBS diagnosed?
- What is the treatment for GBS?
- What is the outcome after GBS?

What is GBS?

- GBS is a neurological disease:
 - Peripheral neuropathy.
 - Demyelination vs. Axonal degeneration.
- GBS is an autoimmune disease.
- GBS is an inflammatory disease.







GBS as an autoimmune disease

- About 70% of GBS cases follow an identifiable triggering event, usually infection:
 - Commonest event is a respiratory infection (“flu”).
 - No relationship between the severity of the infection and the risk of developing GBS or its subsequent severity.
 - Infecting organism is seldom identified (CMV, mycoplasma)
 - Diarrhoea is the next most common antecedent event.
 - *C. jejuni* is the commonest identified cause of GBS overall.
 - GBS rarely occurs following vaccination.

GBS as an autoimmune disease

- The common thread that links these antecedent events is stimulation of the immune response.
- *C. jejuni* has been shown to share certain proteins with peripheral nerve proteins (antigens) and it is known that the immune response to the *C. jejuni* bacterium then involves the nerve because of this “*molecular mimicry*”.
- It is thought that the same mechanism may be operating following other infections but no common antigen has been found.

GBS as an inflammatory disease

- The effector cells of the immune response are the white blood cells which are the inflammatory cells that fight infections.
- Intense inflammation of peripheral nerves is the earliest pathological event in GBS.

How does GBS affect you?

- Many patients first notice mild sensory symptoms, usually distally; i.e., in the feet and/or hands.
- Weakness begins simultaneously or a day or two later and quickly comes to predominate.
 - Just as likely to be distal or proximal in the limbs
 - Usually affects legs first and ascends to the upper limbs
 - Rarely begins with bulbar muscles (face, speech and swallowing)
 - May begin with double vision due to weakness of eye muscles (MFS)
- Muscle cramps and fasciculations (twitching) may occasionally be noted.

Clinical presentation of GBS

- Early pain occurs in about 30% of patients.
 - Deep, aching, cramp-like pain
 - Located proximally (low back, between shoulder blades)
 - May be severe enough to need narcotics (rarely)
- Significant pain may distract from the diagnosis because of the (incorrect) perception that pain does not occur in GBS.
- Treatment of pain with narcotics may exacerbate respiratory symptoms.

Clinical presentation of GBS

- Autonomic nerves are frequently involved but usually asymptomatic:
 - Postural dizziness in those still standing/walking
 - Occasionally rapid and/or irregular heart beat may cause light-headedness
 - Abnormal sweating and temperature of the hands and feet
 - Difficulty urinating (ICU patients are almost always catheterized)
 - Constipation usually not manifest until after a week or so but early attention makes management easier
- Degree of autonomic involvement proportional to the severity of weakness.
- Although usually asymptomatic, autonomic involvement is an important cause of death in GBS patients.

Clinical presentation of GBS

Neurological examination:

- Confirms weakness.
- Sensory loss is absent or minimal.
- Rapid heart beat, particularly if also irregular, necessitates admission to ICU even if breathing is unaffected.
- *Absent or diminished reflexes are almost invariable and is a critical finding, even at the earliest stages of the disease.*

How is GBS diagnosed?

- Clinical suspicion
- EMG/NCS
- CSF examination
- Exclude other conditions in occasional atypical cases
- Lung function tests and ECG are not diagnostic tests but are critical for management.

Diagnosis of GBS

- Any patient presenting with these symptoms is easy to diagnosis.
- Delayed diagnosis is common, usually because all of the symptoms have not yet appeared.

Electromyography (EMG) and nerve conduction studies (NCS)

What is usually known as EMG is actually 2 separate procedures:

- NCS consists of administering electric shocks over the course of nerves and recording the responses from muscles (motor NCS) and from sensory nerves (sensory NCS).
- EMG consists of inserting needle into a number of muscles and recording electrical activity at rest and during contraction of the muscles.

Electromyography (EMG) and nerve conduction studies (NCS)

Motor NCS:

- Comprise the cornerstone on which an accurate diagnosis is based.
- Are used to classify the type of GBS:
 - AIDP in which the primary target is the myelin sheath
 - AMAN in which the primary target is the motor axon.
- Provide invaluable prognostic information:
 - Low amplitude (<10% of normal) of the motor response indicates a high probability of remaining chair or bed bound at a year.

Electromyography (EMG) and nerve conduction studies (NCS)

Motor NCS:

- Speed of conduction is slow in AIDP (<40m/sec in arms and <30 m/sec in legs).
- Conduction block in AIDP.
- Low amplitude responses indicate degree of axon loss:
 - Primary abnormality in AMAN.
 - Secondary axonal degeneration in AIDP.
- May be “normal” early in the course of the disease.
- Abnormalities may be patchy so multiple nerves need to be studied.
- Occasional need to repeat the study in non-diagnostic cases.

Electromyography (EMG) and nerve conduction studies (NCS)

Sensory NCS:

- Of little use in diagnosis of GBS.
- Primarily used to exclude other diagnoses:
 - Severe involvement of sensory nerves indicates a different diagnosis, particularly if motor NCS are normal.

Electromyography (EMG) and nerve conduction studies (NCS)

EMG:

- Of little use in diagnosis of GBS.
- May have some prognostic utility 2-3 weeks after onset of weakness in assessing severity of axon loss, particularly in proximal muscles.

Cerebrospinal fluid (CSF) examination

- CSF is the fluid that bathes the brain (*cerebrum*) and spinal cord.
- Nerve roots exiting the spinal cord traverse the CSF on their way to the limbs.
- The primary site of pathology in GBS is the nerve root and inflammation in nerve roots leads to protein leakage into the CSF, resulting in the characteristic high CSF protein.
- The inflammation remains largely confined to the nerve roots so inflammatory cells are not seen in significant numbers.
- This almost unique combination of high protein but few cells (albuminocytologic dissociation) led Guillain and colleagues to distinguish this condition from polio.

Cerebrospinal fluid (CSF) examination

- CSF is obtained by inserting a needle under local anesthetic into the lower spine, between vertebral the bones, and draining a small amount of the fluid.
- Despite urban myth, the procedure is:
 - Only minimally painful in most patients.
 - Never causes paralysis.
 - Rarely causes infection or hemorrhage.
- Causes headache in ~25% of patients which is severe in ~5%.

How is GBS treated?

- Most important treatment is supportive:
 - Even without specific immune therapy ~70% of GBS make a good recovery.
 - Prior to the development of good supportive care the mortality of GBS was about 25%

Supportive care in GBS

- Acute supportive care:
 - Support breathing
 - Prevent infections
 - Prevent blood clots
 - Pain management
 - Emotional support
- Chronic supportive care:
 - Physical therapy
 - Occupational therapy
 - Pain management
 - Emotional support

Immunotherapy in GBS

- Intravenous immunoglobulin (IVIg).
- Plasma exchange (PLEX).
- Do NOT use steroids.

Immunotherapy in GBS

- IVIg and PLEX about equally effective.
- IVIg easier to administer.
- IVIg may be safer (but not in major studies).
- Treatment does not prevent deterioration or improve mortality.
- Treatment accelerates recovery:
 - Less time in the hospital.
 - Less time in rehab.

What is the outcome after GBS?

- About 70% of patients fully recover strength.
- Typically takes several months but may take up to 2 years.
- Patients who recover slowly usually recover incompletely.
- About 55% to 80% of patients have long term residual fatigue.
- About 5% of patients die from the complications of GBS (pneumonia, pulmonary embolism, cardiac arrhythmia).