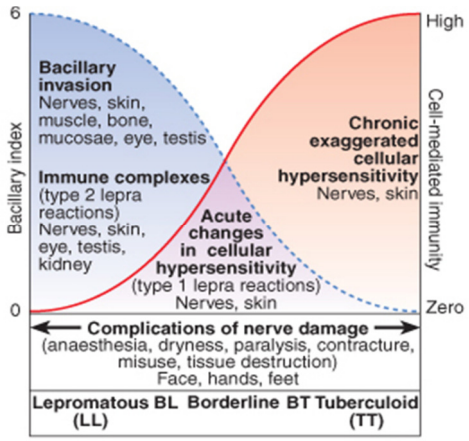
Leprosy (Hansen's disease)

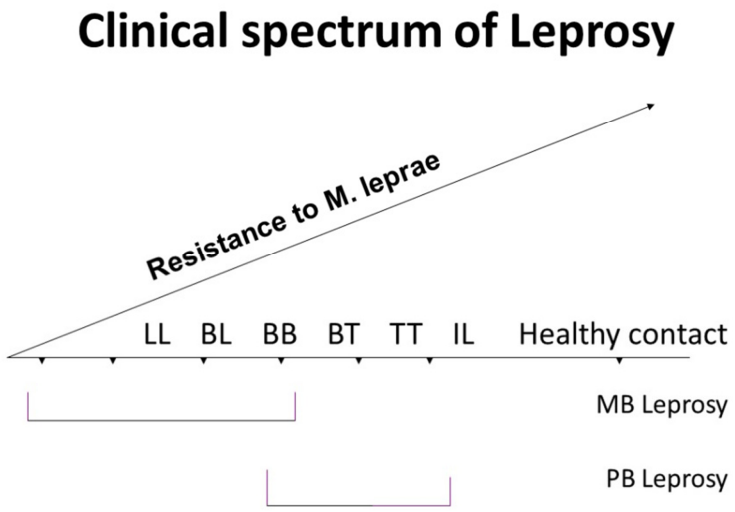
- It is a chronic granulomatous disease affecting skin & nerves. It is caused by *Mycobacterium leprae*, a slow-growing mycobacterium which cannot be cultured in vitro; it grows only on the foot pad of armadillos.
- The clinical manifestations of the disease are determined by the degree of the patient's cell-mediated immunity towards M. leprae.
- High levels of CMI with elimination of leprosy bacilli produce tuberculoid leprosy, whereas absent CMI results in lepromatous leprosy.
- The complications of leprosy are due to nerve damage, immunological reactions & bacillary infiltration.
- Leprosy patients are frequently stigmatized & using the word 'leper' is inappropriate.

Epidemiology & Transmission

- 4 million people have leprosy.
- 750.000 new cases are detected annually.
- 70% of the world's leprosy patients live in India, with the disease endemic in Brazil, Indonesia, Mozambique, Madagascar, Tanzania and Nepal.
- Untreated lepromatous patients discharge bacilli from the nose
- Infection occurs through the nose, followed by haematogenous spread to skin & nerve.
- Incubation Period is 2–5 years for tuberculoid cases, 8–12 years for lepromatous cases.
- Leprosy incidence peaks at 10–14 years & more common in males & in those with close households.



Leprosy: mechanisms of damage and tissue affected. Mechanisms under the broken line are characteristic of disease near the lepromatous end of the spectrum, and those under the solid line characteristic of the tuberculoid end. They overlap in the center where, in addition, instability predisposes to type 1 lepra reactions. At the peak in the center neither bacillary growth nor cell-mediated immunity has the upper hand. (BL = borderline lepromatous; BT = borderline tuberculoid)



Cardinal features of leprosy

- Skin lesions, typically anesthetic at tuberculoid end of spectrum
- Thickened peripheral nerves
- Acid-fast bacilli on skin smears or biopsy

Clinical characteristics of the polar forms of leprosy		
Clinical and tissue-specific features	**Lepromatous**	**Tuberculoid**
Skin and nerves Number and distribution	Widely disseminated	One or a few site, asymmetrical
Skin lesions Definition • Clarity of margin • Elevation of margin Color • Dark skin • Light skin Surface Central healing Sweat and hair growth Loss of sensation	 Poor Never Slight hypopigmentation Slight erythema Smooth, shiny None Impaired late Late	 Good Common Marked hypopigmentation Coppery or red Dry, scaly Common Impaired early Early and marked
Nerve enlargement and damage	Late	Early and marked
Bacilli (bacterial index)	Many (5 or 6+)	Absent (0)
Natural history	Progressive	Self-healing
Other tissues	Upper respiratory mucosa, eye, testes, bones, muscle	None
Reactions	Immune complexes (type 2)	Cell-mediated (type 1)

Reactions in leprosy		
	Lepra reaction type 1 (reversal)	**Lepra reaction type 2 (erythema nodosum, ENL)**
Mechanism	Cell-mediated hypersensitivity	Immune complexes
Clinical features	• Painful tender nerves, loss of function • Swollen skin lesions • New skin lesions	• Tender papules and nodules; may ulcerate • Painful tender nerves, loss of function • Iritis, orchitis, myositis, lymphadenitis • Fever, edema
Management	Prednisolone 40mg, reducing over 3-6 months[1]	Moderate: prednisolone 40 mg daily Sever: thalidomide[2] or prednisolone 40-80 mg daily, reducing over 1-6 months; local if eye involved[3]

[1] Indicated for any new impairment of nerve or eye function.
[2] Contraindicated in fertile women.
[3] 1% hydrocortisone drops or ointment and 1% atropine drops.

Diagnosis

- **Clinical**: by finding cardinal sign.
- Supported by finding AFB in slit-skin smears (by scraping dermal material on to a glass slide) or typical histology in a skin biopsy.
- The smears are stained for AFB,the number counted/high-power field & score derived on a logarithmic scale (0–6): the bacterial index (BI).
- Smears useful for confirming diagnosis & monitoring response to treatment.
- Neither serology nor PCR for M. leprae DNA is sensitive or specific enough for diagnosis.

Principles of leprosy treatment

- Stop the infection with chemotherapy
- Treat reactions
- Educate the patient about leprosy
- Prevent disability
- Support the patient socially and psychologically

Modified WHO-recommended multidrug therapy (MDT) regimens in leprosy			
Types of leprosy[1]	**Monthly supervised treatment**	**Daily self-administered treatment**	**Duration of treatment[2]**
Paucibacillary	Rifampicin 600 mg	Dapsone 100 mg	6 months
Multibacillary	Rifampicin 600 mg Clofazimine 300 mg	Clofazimine 50 mg Dapsone 100 mg	12 months
Paucibacillary single-lesion	Ofloxacin 400 mg Rifampicin 600 mg Minocycline 100 mg		Single dose

[1] Classification uses the bacillary index (BI) in slit-skin smears, of if BI is not available, the number of skin lesions:

- Paucibacillary single-lesion leprosy (one skin lesion)
- Paucibacillary (2-5 skin lesions)
- Multibacillary (> 5 skin lesions)

[2] Studies from India have shown that multibacillary patients with an initial BI > 4 need longer treatment, for at least 24 months.

Prognosis

- Untreated, TL has good prognosis; it may self-heal & peripheral nerve damage is limited.
- (LL) is a progressive condition with high morbidity if untreated.
- After treatment, the majority especially those who have no nerve damage at the time of diagnosis, do well, with resolution of skin lesions.
- Borderline patients are at risk of developing type 1 reactions which may result in devastating nerve damage.

Prevention

Primary health-care workers are now responsible for case detection and provision of MDT.

Multiple Choice Questions:

1) There are many animal reservoir of leprosy. (F)
2) Leprosy diagnosed by culture on artificial media. (F)
3) Leprosy is a stigmatizing disease. (T)
4) Leprosy is best diagnosed by PCR. (F)
5) Multi-bacillary leprosy is due to high host CMI. (F)
6) Leprae reactions are due to undulations in immunity. (T)
7) Treatment should be always with multiple drugs. (T)
8) Treatment usually given for years. (T)
9) In some cases single dose of MDT may suffice. (T)
10) Leprosy affects only skin & nerves. (F)
11) The whole mark of leprosy is presence of hypothetic or anesthetic hypo pigmented skin lesions. (T)
12) Leprosy may have a short incubation period. (F)
13) Leprosy is highly infectious. (F)