

Glossary of relevant medical and scientific terms

Alzheimer's disease

The most common dementing illness of the elderly in the UK. The neuropathology of Alzheimer's disease is significantly different from that of CJD and the clinical course of the disease is normally of the order of several years.

Amyloid

A chemical structure which can accumulate in body tissue, including brain tissue, as a result of a variety of different diseases. In CJD the amyloid is normally made-up of the prion protein.

Amyloidosis

The build up of amyloid to a degree that it causes damage to the tissues or action of those tissues in the body.

Astrocyte

One of the glial cell types in the brain that supports the functions of the neurones and reacts to neuronal injury and death.

Astrocytosis

The proliferation and enlargement of astrocytes in brain tissue. This is a common finding in CJD neuropathology but it is not specific to this disease.

Ataxia

Inability to coordinate muscle control resulting in irregularity or clumsiness of movements.

Bioassay

The inoculation of an infective substance into another animal in order to see if the second animal develops the same disease. Different dilutions of that substance are used to assess how infective the substance is.

BSE

Bovine spongiform encephalopathy. A TSE of cattle identified worldwide. In the UK a large epidemic occurred in the 1980s-1990s.

Clinicopathological correlations

The relationship between the clinical symptoms of a patient and the pathological findings. For example, ataxia in a patient may relate directly to cerebellar degeneration when this part of the brain is examined under the microscope.

CWD

Chronic wasting disease. A TSE of farmed and free ranging deer and elk found largely in North America.

CNS

Central nervous system. General term used to describe the brain and the spinal cord.

Codon-129 polymorphism

Polymorphisms are common variations in the DNA code in genes, named with the number of the position ('codon') where they occur. Many polymorphisms have no directly harmful effects. The prion protein gene (*PRNP*), like other genes, has polymorphisms. One important one exists at codon 129 of the gene, with the presence of the DNA code for either methionine (M) or valine (V) (these are amino acids, the chemicals that make up proteins). People have two copies of the gene (one from each parent) and can therefore have a methionine/methionine (MM), methionine/valine (MV) or valine/valine (VV) genotype. The codon 129 genotype affects CJD susceptibility and phenotype but does not directly cause disease.

- CJD**
Creutzfeldt-Jakob disease. The most common human TSE which is usually characterised by a rapidly progressive dementia, along with other neurological factors. Initially identified in the 1920s through the work of Jakob and Creutzfeldt.
- CSF**
Cerebrospinal fluid. The clear fluid that fills the ventricles of the brain and flows out to surround the brain and spinal cord.
- CSF protein**
Protein found in the CSF in healthy individuals and in various diseases. Certain CSF proteins may aid clinical diagnosis of CJD. Examples include 14-3-3, tau, and S-100b.
- DNA**
Deoxyribonucleic acid. The chemical that carries genetic information in the form of genes in the chromosomes of animals, plants and some viruses. DNA encodes the amino acid sequence of proteins that are critical for the structure and function of the body.
- Dominant**
Dominance refers to the extent to which one form of a gene affects the individual; a dominant form has a larger effect over another, which would be termed recessive. In the case of a disease caused by a mutation in a gene, an individual may have two copies of the gene (one from each parent) without the mutation (and, therefore, be free of the disease) or may have either only one gene copy with the mutation or both copies with it. If inheriting only one mutated copy is sufficient to cause disease, then it is said to be a dominantly inherited mutation disease. If both copies need to be abnormal to cause disease, then it is said to be a recessively inherited disease.
- “Downer” cows**
A term used to describe cattle that do not have the ability to stand. This is one of the symptoms of BSE, but it can also have many other causes.
- EEG**
Electroencephalogram. A trace of the electrical activity in the brain. In CJD this can show characteristic appearances in some patients.
- Epidemiology**
The study of the distribution and determinants of disease.
- FFI**
Fatal Familial Insomnia. A disease found in humans related to a genetic mutation of the prion protein gene (PRNP). It is clinically and pathologically distinct from CJD
- FSE**
Feline spongiform encephalopathy. A TSE of the domestic cat, thought to be related to the consumption of BSE material in cat food.
- Gene**
A unit of genetic material, composed of DNA that forms part of chromosomes and which is responsible for the manufacture of protein. Each protein has an important role to play in the structure and function of the body. Hence the genetic make-up (or genotype) of an individual determines their attributes (or phenotype). A gene can exist in two or more forms (alleles). Individuals have two copies of genes (one from each parent).
- Genetic Mutation**
A chemical change in a gene that can cause it to have a different function. This can include the production of abnormal protein which can lead to the development of disease.

Genotype

The sum total of genetic information carried by an individual (contrast with phenotype)

GSS

Gertmann-Straussler-Scheinker Disease. A familial prion disease found in humans and associated with specific mutations of the prion protein gene (PRNP).

Iatrogenic

A disorder which is caused by a medical treatment. In CJD infection from person to person has been caused by injections of contaminated human pituitary hormone preparations, human dura mater grafts and rarely by corneal transplants and surgical instruments.

Immunohistochemistry

Chemical techniques used to identify the deposit of particular chemicals or proteins in tissue. Commonly used to locate prion protein in brain tissue from CJD patients using an anti-PrP antibody.

Infectious Agent

The organism or chemical structure that causes a particular disorder. The infectious agent that causes prion diseases is generally called a 'prion'. Scientific opinion is divided about the biological nature of prions. The two main theories are: the prion hypothesis (stating that the prion is entirely or largely consists of abnormally folded prion protein) and the virus theory (stating that a virus or a virus-related structure is involved).

Kuru

A TSE found only in the Fore tribe in New Guinea most likely related to ritualistic mourning cannibalism carried out among members of the tribe. Transmissibility of the disease was established through the work of Carlton Gajusek.

Microglia

Cells normally found inside the CNS that respond to infection and to injury to neurones in a similar way to the white cells found in blood.

Murine models

Laboratory methods that use mice to mimic disease (such as TSEs).

MRI

Magnetic resonance imaging. A medical imaging technique used to visualise the internal structure of the brain, amongst others. A useful supportive diagnostic test in variant and sporadic CJD, used to detect certain characteristic abnormalities in these conditions, and to help exclude other diagnoses.

Myoclonus

Clonic (alternate contraction and relaxation) spasm or twitching of a muscle or group of muscles

Neuroanatomy

The anatomy of the brain, spinal cord and peripheral nervous system.

Neurone

The key functional cell in the brain, whose electrical activity allows the rapid transmission of signals from one part of the nervous system to another.

Passage

The process of transmitting disease from one animal to another, in CJD usually by inoculation of brain material.

Pathogenesis

The production of damage (pathology) in a tissue.

Pathology

The tissue-based study of disease, ranging from autopsy to microscopy.

- PCR**
Polymerase chain reaction. A method used to make multiple copies of DNA. A stage used in the examination of a DNA sample to determine whether they have a genetic mutation or not.
- PNS**
Peripheral nervous systems. The nervous system outwith the brain and spinal cord. The main function of the PNS is to connect the CNS to the limbs and organs.
- Phenotype**
The characteristics of an organism determined by the genes that it carries and the influence of the environment, including disease.
- Plaques**
The accumulation of an abnormal protein that may build up in brain tissue outside the neurones as a result of infection (as in CJD) or neurodegeneration (as in Alzheimer's disease).
- PMCA**
Protein misfolding cyclic amplification, used as a method for the detection of abnormal prion protein
- Prion**
The infectious agent of prion diseases. The name was derived from PROteinaceous INfectious agent. The prion hypothesis holds that the infective agent of CJD (and the other TSEs) is composed only (or mainly) of abnormal protein and does not contain nucleic acid which would be necessary if the agent was a conventional virus.
- PRNP**
The prion protein gene in humans, located on the short arm of chromosome 20.
- PrP**
The prion protein. This is a normally occurring protein (designated PrP^c) found on the surface of particular cell types. The abnormal disease-associated form of prion protein (designated PrP^{Sc} irrespective of its biochemical form and the species from which it is derived) accumulates in the brain in prion diseases, and according to the prion hypothesis, is the only (or main) constituent of prions.
- RNA**
Ribonucleic acid. An chemical intermediate between genes and the proteins that the genes encode. Also found in some viruses as the nucleic acid that carries the genome of the agent.
- SAF**
Scrapie associated fibrils. These are the fine structures, seen under the electron microscope that are only found in brains of TSEs.
- Scrapie**
A widespread TSE of sheep or goats.
- Species barrier**
The naturally occurring barrier between different species of animal, which makes transfer of a disease from one to the other difficult.
- Sporadic**
Cases of CJD are categorised as sporadic if they have no genetic mutation or are not due to infection (as in iatrogenic or variant CJD).
- Strains**
Different forms of the sheep TSE scrapie have been isolated by transmission to mice. These strains cause variations in the incubation period and pattern of pathology observed in the infected animal. Scientists are currently trying to find out how many strains of CJD there are.

TME	Transmissible mink encephalopathy. This is a TSE of mink found mostly in mink farms in the US. It was initially reported in the 1960s, and is very rare.
TSE	Transmissible spongiform encephalopathy. A disease that has the characteristic spongiform changes in the brain and is experimentally transmissible.
Ultrastructure	The very detailed minute physical structure of tissues, including the presence and appearance of amyloid.
vCJD	Variant Creutzfeldt-Jakob disease, first reported in 1996 as a new form of CJD, with clinical presentation and neuropathological features distinct from classical CJD
Vertical transmission	The transmission of an illness from the parent(s) to the offspring.
Virus	A infective agent with a specific structure and able to cause its own multiplication after infection of specific cells.
VPSPr	Variably protease sensitive prionopathy (VPSPr) is a relatively newly described (in 2008) human prion disease of unknown aetiology. Its precise relationship with other prion diseases is uncertain but no mutations have been found in the <i>PRNP</i> coding sequence and the patients have no (known) risk factors for iatrogenic CJD. The reported cases have clinico-pathological profiles and protein biochemical characteristics that differ from those seen in variant or sporadic CJD. The clinical features are not yet fully characterised but the reported cases have been middle-aged to elderly with relatively longer disease durations than for sporadic CJD.