Risk to humans of transmission of novel TSE isolates by cell free conversion assays

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Background

Various transmissible spongiform encephalopathy (TSE) isolates represent a real threat to human health. Others represent an unknown, but potential threat, which must be quantified to allow rigorous assessments of the risk of transmission to humans.

Research Approach

A cell-free conversion assay had been developed that mimics species barriers, among other disease characteristics. The assay uses bacterial recombinant prion protein (PrP) as a substrate, which is converted to a protease-resistant isoform from TSE-infected animals. The researchers had already cloned and expressed human recombinant PrP and used their assay to measure the potential for a range of different TSE isolates to infect humans homozygous for methionine or valine at codon 129. These isolates included BSE from sheep, chronic wasting disease (CWD) and atypical scrapie. To quantify the risk of transmission appropriate controls were used, including cattle BSE.

Results

The results suggested that (i) humans that are homozygous for methionine at position 129 of prion protein are likely to be the most susceptible to all forms of prion disease tested but that (ii) novel forms of prion disease are not more likely than cattle BSE to pass to humans and, in most cases, less likely. However, in order to generate a full picture of the likely risk to humans posed by atypical forms of prion disease, the results of other studies in transgenic mice should be taken into account, as should the likely levels of prion infectivity in the tissues of animals infected with novel forms of prion disease. These results will benefit the agency and public in contributing background data to the generation of risk assessments.

Research report

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