required for pathogenesis, giving rise to chronic, subclinical infections. In that case, there would be a clinically silent reservoir of prions in otherwise healthy hosts. Because we do not yet have sensitive screening assays for prion infectivity, such reservoirs may be hard to identify and even harder to eradicate.

Race and Chesebro[2] now show that if mice are inoculated intracerebrally with hamster prions, infectivity is found in their brains and spleens for periods approaching their lifespan. Although the amounts of prion protein are low, and they do not seem to increase significantly with time, they are found very reproducibly. Moreover, the authors detected infectivity only in inoculated wild-type mice — not in *Prnp* knockout mice — indicating that mouse PrP^{C} is required (Fig. 1).

One may feel inclined to dismiss this unexpected observation as a low-level breach of the tight species barrier that exists between mice and hamsters. What is surprising, however, is that the infectivity found in wild-type mice has the property of hamster and not of mouse prions — it does not cause scrapie in mice, but when it is injected into hamsters they develop symptoms of disease.

Two interpretations are possible: either the infectivity is due to persistence of the hamster prions from the inoculum, or it is the result of low-level replication of the hamster agent in the mouse. Race and Chesebro espouse the first explanation, presumably because the amount of infectivity recovered from the mice is several orders of magnitude lower than that injected. It would have been useful to determine the levels of hamster prion early after inoculation into the mouse because, a few days after mice are intracerebrally inoculated with mouse prions, infectivity in the brain becomes virtually undetectable. Levels can only be measured weeks or months[9] afterwards, depending on the strains of prion and mouse. If such a decrease in levels of the infectious agent occurs in the experiment of Race and Chesebro, this might indicate that the prions are replicating rather than merely persisting.

Although not discussed by the authors, the possibility of low-level replication of the infectious agent cannot be excluded. If offset by concomitant degradation, this would lead to a low, steady-state level of infectivity. Such a process could be readily explained by a virus or virino hypothesis. But it can also be explained within the framework of the protein-only hypothesis. One would have to imagine that the pathological PrP molecules that constitute the hamster prion (and have a different amino-acid sequence from that of mouse PrP^{C}) can impart a new conformation to the mouse PrP^{C}, giving it the properties of a hamster rather than a mouse prion — in other words, primacy of conformation over sequence. In the case of BSE, if the infectious agent responsible is given to various hosts it still gives rise to pathological prion protein (PrP^{Sc}) retaining at least some of its conformation-dependent properties[4,8]. So, it is important to clarify whether hamster prions are replicating silently in wild-type mice, or whether they are merely persisting.

Race and Chesebro note that it may not only be mice and hamsters that behave in this way when exposed to prions from other species. This could have considerable implications — for example, farm animals that do not contract overt disease after consuming ruminant-derived meat and bone meal may, perhaps, develop a subclinical carrier state. Pigs and chickens that have been fed with cattle-derived bone and meat meal are thought to be safe to eat with respect to BSE, because these animals do not develop disease after oral exposure to bovine prions. But, to the best of our knowledge, bovine prions from BSE-exposed pigs and poultry have never been assayed using calves as 'indicator' animals.

Why, in the experiments of Race and Chesebro, does hamster infectivity not persist in mice that lack the gene encoding PrP^{C}? It is possible that the immune system is involved. Mice lacking PrP develop a cellular immune response to PrP^{C} (ref. 10), and, in fact, some of the best monoclonal antibodies to PrP^{Sc} have been derived from such mice[11]. Perhaps hamster prion infectivity cannot persist in PrP-deficient mice because anti-prion or anti-PrP antibodies wipe it out. In the wild-type mice, however, it could persist owing to their relative immune tolerance to PrP^{Sc}. This hypothesis could be tested by repeating the experiment reported here with mice that do not express wild-type mouse PrP^{C} and are immunocompromised. Given the current interest in the collusion between prions and immune cells, such experiments are likely to be undertaken sooner rather than later. □

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Daedalus

Penetrating gaze

There's an audio-analyser for telephone conversations, which is alleged to reveal when the speaker is lying. Duplicity, it seems, causes detectable changes in certain voice-frequencies. But in normal life, even verbal communication is largely visual. It is claimed that 55% of a speaker's impact derives from his appearance and body language, 38% from his tone of voice, and only 7% from what he actually says. So Daedalus is taking the obvious next step. He is devising an image-analyser to tell if a speaker on video is lying.

DREADCO technicians have set up a special studio for the purpose, using high-resolution cameras with an enhanced frame-rate. Volunteers, from clergymen through accountants to car salesmen and juvenile criminals, are being invited to converse on a wide range of topics, from philosophical speculation to embarrassing personal confessions, lying whenever they feel they can get away with it. A panel of detectives, psychiatrists and tax inspectors is studying the footage, and the DREADCO team are correlating their conclusions with details from the tape.

Each frame is analysed by modern pattern-recognition software, to identify the face and body of each speaker; these are then being searched for specific clues. Daedalus expects a liar to show subtle inconsistencies between face and body; blink-rate and gaze direction may conflict with hand-movements or shifting stance, and both may conflict with verbal stresses in the audio channel. A full spatial Fourier analysis of all movements should reveal the key stigmata of dishonesty, and with luck will be able to place it on a spectrum from trivial detail-bending to major fraud. The most reliable audiovisual indicators of dishonesty will then be simplified, enhanced, and adapted for normal TV and closed-circuit video signals.

DREADCO's 'Lying Eye' program will sell like hot cakes, starting in the rapidly growing video-conferencing market. Those base suspicions of tele-workers, long-distance contacts, and all the other evasive types who won't attend proper meetings, will be rapidly tested. The next obvious market will be the law — both for police interviews (now routinely videotaped to avoid claims of trickery) and in the courts themselves. Many doubtful cases will collapse spontaneously when it turns out that the plaintiff, the defendant, the witnesses on both sides, and the defending and prosecuting lawyers themselves, are all lying.

David Jones