virus but that it is locked up inside a tough proteinaceous capsule [3]; furthermore, in a recent contribution to the debate [4], very convincing virus-like particles are revealed in scrapie hamster brain.

The presence of a capsule would explain the agent's extraordinary resistance to all the manoeuvres which inactivate viruses including ionising radiation; formalin fixation for 10 years and [5], 'exposure to huge doses of ultra-violet light'. Researchers should concentrate on cracking its tough capsule. About a hundred years ago Robert Koch was confronted by a similar situation, albeit at the microscopic rather than the ultramicroscopic level. His efforts to make progress with the tubercle bacillus came to a standstill until he tackled its tough (lipid) capsule.

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Non-invasive assessment of cerebral oxidative metabolism in the human newborn

Sir—The controversy about the relative importance of hypoxia and ischaemia in neonatal brain injury is highlighted in the article by Dr Wyatt (March/April 1994, page 126). The purest example of hypoxic brain injury without ischaemia is caused by the inspiration of a gas not containing oxygen, as for example, with the inhalation of pure helium in divers, or pure nitrous oxide in anaesthetised patients [1]. This is associated with cerebral vasodilation and rapid opening of the blood-brain barrier. The importance of the blood-brain barrier is not addressed by Dr Wyatt. Olesen [2] has demonstrated experimentally that the maintenance of the blood-brain barrier requires an adequate oxygen supply. Ensuring glucose delivery to the brain in hypoxic perfusion does not maintain the status quo, because of the barrier failure. Obviously, in neonates the issue may be complicated by the possibility of head trauma during birth with structural injury. This may also cause mechanical disruption of the blood-brain barrier. Barrier disruption leads to oedema and to oxygen transport limitation. This mechanism is almost certainly responsible for the delayed energy failure and neuronal death. Dr Wyatt does not cite any evidence to support his hypothesis that a 'complex sequence of cytotoxic reactions is initiated within the neuron which, despite the maintenance of cerebral oxygenation and perfusion, inexorably lead over the next 72 hours to late failure of oxidative phosphorylation and permanent neuronal injury or death'. How under these circumstances have tissue perfusion and oxygenation been assessed?

In stroke patients the existence of the ischaemic penumbra surrounding an area of infarction is well known. Neurons in this zone have sufficient oxygen to prevent membrane failure, but not enough to function. They have been termed 'idling' neurons. Oxygen has been used to demonstrate the viability of this brain tissue using SPECT imaging with remarkable results [3]. Serial oxygen therapy can allow capillary neogenesis with restoration of normal levels of blood flow and function. This is presumably part of the normal mechanism of recovery.

The use of high technology has now allowed the consequences of hypoxia and ischaemia to be demonstrated *in vivo* in the newborn, but we remain blinded to the obvious. The essential cerebroprotective measure is to provide adequate tissue oxygenation. Normal blood gases cannot ensure that tissue oxygenation is adequate. If the period of delivery is hazardous because of the possibility of failure of adequate oxygenation, then it surely makes sense to give more oxygen at this time. This was suggested in 1959 by Harry Prystowsky [4], who showed that giving more oxygen to the mother does not result in fetal hyperoxia in the normal infant because of autoregulation. However, he emphasised the need to consider the one baby in 20 at risk of hypoxia during delivery who would benefit from more oxygen. This particularly applies to premature neonates where a reduction of the risk of cerebral palsy would be expected. Prevention of a hypoxic episode is certain to be better than any attempt to cure the consequences.

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