The Extent of the Problem

The consequences—personal and financial, to the individual and society—of CNS injury are staggering. Consider the following:

Throughout the world, there are about 150 to 200 cases of cerebral ischemia and hemorrhage for every 100,000 people annually. Surprisingly, the incidence in developing countries, such as those in Asia and Africa, is comparable to that in industrialized countries. In the United States alone, an estimated 2.5 million people suffer from CNS damage caused by cerebral trauma, ischemia, or hemorrhage every year. Approximately 250,000 of these people will die as a result of their injuries. CNS injury is a major cause of death and disability worldwide, and its associated financial impact is immense.

The State of Current Knowledge

An understanding of the molecular mechanisms involved in CNS injury is crucial to the successful development of therapies for cerebral trauma, ischemia, and hemorrhage. Although the various types of CNS injury differ in the mechanics of the “primary injury,” research suggests that a “secondary injury” process involving a complex series of destructive biochemical events is a common component among all CNS injuries.
The Theories of Progressive Secondary Tissue Damage

Research into the events involved in progressive secondary tissue damage has led to the development of two major hypotheses. The excitotoxic neurotransmitter hypothesis suggests that large amounts of glutamate are released during CNS injury, causing sustained elevations in intracellular calcium influx and, thus, cytotoxic effects.\(^1,^4\) The free radical hypothesis proposes that lipid peroxidation is the central mediating event in progressive secondary tissue damage.\(^1,^3,^4\) This hypothesis has received considerable attention and is currently the focus of intense research efforts at The Upjohn Company.

The Cascade of Damage

Experimental models indicate that lipid peroxidation is initiated by oxygen free radicals that originate from a number of sources within injured or ischemic tissues. As highly reactive by-products, oxygen free radicals interact with fatty acids present in cell membranes, producing new free radicals that are able to attack other fatty acids in the membrane in a dominolike progression. This cascade of oxidative damage is believed to result in primary membrane dysfunction and, if severe enough, cell death.\(^1,^3,^5\)

A Promising Direction

The Upjohn Company is a research leader in elucidating the role and the mechanisms of progressive secondary tissue damage. If the theory of lipid peroxidation is validated, understanding the role of this central event in progressive secondary tissue damage will create a therapeutic objective: Interrupting or preventing the progression of lipid peroxidation may significantly enhance the possibility for improving tissue survival surrounding the primary CNS injury.

References


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Travel grants

The Guarantors of Brain are prepared to consider applications for part or all of the costs incurred by clinical and non-clinical neuroscientists, aged under 40 and based in the United Kingdom, wishing to visit laboratories or clinical departments at home or abroad. A maximum of three separate awards of up to £2000 each may be available to applicants.

Applications will be considered for attendance at scientific meetings which relate directly to the applicants' research interests. The Guarantors are unlikely to meet all of the costs of these visits and encourage applicants to seek part of their expenses from other sources.

Four copies of each application must be submitted at least 2 months before the planned date of departure.

The following documents are required:
1. An abbreviated curriculum vitae with a list of publications.
2. An account of the purpose of the visit.
3. The names of two referees.
4. A letter of invitation from the Host Department or a letter of acceptance of an abstract.
5. A statement of the costs with details of related applications.
6. A list of previous awards given by the Guarantors of Brain.

All successful applicants are expected to submit a short report of the visit on their return.

Visiting Lecturer Bursary Scheme

The Guarantors of Brain have made available three bursaries to allow international or British scientists of repute to be invited to visit established clinical departments or laboratories in the UK to share information, techniques and experiences.

The bursaries will be awarded by competition annually. Each bursary will require that the Visiting Lecturer spend five working days in the host institution.

The Visiting Lecturer will be expected to participate in the daily activities of the host laboratory or department and to give informal seminars as well as a formal lecture to which outsiders will be invited. This lecture will be called a 'Brain Lecture'.

The Visiting Lectureship will be awarded annually by competition. The hosts will be the applicants. Applicants should state the name of the proposed Lecturer, append his curriculum vitae and justify on one or two A4 pages the reasons for the visit and the aims to be achieved.

In 1994, applications should be forwarded to Professor Frackowiak by the beginning of October, 1994. Decisions will be made at the AGM of the Guarantors of Brain in December, 1994. The successful host laboratories will be responsible for the practical arrangement of visits and will be required to submit a short report and account of the visit on completion.

Lecturers may extend their stay at will and indeed the Lectureships and the 'Brain Lectures' will be announced in the Journal and in the ABN newsletter, so that other laboratories can avail themselves of the expertise of the Visiting Lecturer, outside the five working days in the host laboratory, if so desired.

Each Bursary will include an economy class return airfare, the cost of lodging for six nights and an honorarium of £200 per day.

Applications for travel grants and the visiting lecturer bursary scheme, and reports concerning travel grants should be sent to Professor Richard Frackowiak, MRC Cyclotron Unit, Hammersmith Hospital, 150 Ducane Road, London W12 0HS, UK (Tel: 081 994 6945).
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