Journal of Neurology, Neurosurgery, and Psychiatry 1987;**50**:1514–1521

Anti-CNS antibodies in neurological and psychiatric disorders

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SUMMARY To investigate the possibility that anti-CNS antibodies may play a pathogenic role in a number of neurological and psychiatric disorders, a population study was undertaken. Serum samples were obtained from a total of 257 adults and were screened against sodium dodecyl sulphate polyacrylamide gel electrophoretic blots of various normal, necropsy-derived adult human brain regions. The incidence of IgG immunoreactive banding in the total sample was 30%. Within the diagnostic groups the incidence of banding was: controls 32%, schizophrenia 28%, mental retardation 27%, cerebellar ataxia 33%, Parkinson's disease 22%, myasthenia gravis 45% and epilepsy 31%. The differences are not statistically significant. There was no significant difference in the numbers and locations of bands between the various diagnostic groups and the controls. The overall incidence of immunoreactivity corresponding to the high molecular weight subunit of neurofilaments was only 6%, thus not confirming a previously reported incidence of 95%. The similarity between the diagnostic and the control sera suggests that caution should be exerted in interpreting the pathogenic significance of anti-CNS immunoreactive banding on Western blots.

Autoimmune involvement has been demonstrated in neurological illnesses such as myasthenia gravis,[2-4] the Guillain-Barré syndrome[5-7] and multiple sclerosis (reviewed by Weiner and Hauser[8]). To investigate the possibility that anti-central nervous system (CNS) antibodies may play a wider pathogenic role in neurological and psychiatric diseases, a population study was undertaken. Serum samples were collected and screened against Western blots of human CNS tissue. Immunoblots have the advantage over tissue sections in that immunoreactivity can be resolved to a finite number of bands whose molecular weights can be determined. Our results are presented in tabular form so that comparisons with other studies will be possible.

Diagnostic groups in which the published literature suggested the presence of anti-CNS antibodies were selected for investigation: myasthenia gravis, cerebellar degenerations, diseases of the basal ganglia and schizophrenia. In myasthenia gravis, the serum antibody response is to the acetylocholine receptor (AChR).[2-4] The possibility of anti-CNS antibody activity in myasthenia gravis has been raised in several studies. Kott and Rule[9] reported a cellular immune response to myelin basic protein in some myasthenia gravis patients. Antibodies to the AChR have been found in the cerebrospinal fluid (CSF) of some myasthenia gravis patients, suggestive of intrathecal production[10] and CSF oligoclonal immunoglobulin G (IgG) bands have been demonstrated.[11] Also, sera of myasthenia gravis patients contains significantly elevated levels of antibodies to neuroblastoma cells.[12] These studies suggest a more generalised neuroimmunological abnormality in myasthenia gravis, not one limited to the neuromuscular junction.

Several lines of investigation have suggested the presence of autoantibodies in cerebellar diseases. Serum and CSF antibodies to cerebellar Purkinje cells have been demonstrated in patients with paraneoplastic cerebellar degenerations.[13-15] In the childhood opsoclonus-myoclonus syndrome, circulating antibodies to Purkinje cells are present.[16] Anti-cerebellar antibody activity in other forms of

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Received 18 July 1986 and in revised form 31 December 1986. Accepted 5 January 1987