

Research Reports

A Survey of MabQ113 Immunoreactivity in the Adult Rat Brain: Differential Staining of the Lateral and Medial Habenular Nuclei

AUDRIUS V. PLIOPLYS and RICHARD HAWKES

Laboratory of Neurobiology and Department of Biochemistry, Laval University, Quebec, Que G1J 1Z4 (Canada)

(Accepted October 15th, 1985)

Key words: habenula — monoclonal antibody — immunocytochemistry

Monoclonal antibody mabQ113 recognizes a polypeptide antigen which, in rat cerebellum, is confined exclusively to a subset of Purkinje cells which are organized into parasagittal bands. In this report we have explored the distribution of mabQ113 immunoreactivity in some other regions of the rat brain. The most interesting result was a dramatic differential staining of the habenular complex in which mabQ113 densely and uniformly stained the lateral habenula but did not stain the medial habenula. Within the lateral habenula reaction product is localized primarily in the cellular processes of astrocytes but there is also staining of neighboring neuronal dendritic and axonal profiles. The afferent and efferent tracts of the habenular nuclei are not immunoreactive and there was no systematic difference in staining between the afferent and efferent nuclear groups of the two habenular nuclei. The pattern of mabQ113 immunoreactivity in rat brain is distinct from previously described biochemical differentiation markers of the two nuclei and thus may serve as a useful probe to study habenular anatomy, development and function.

INTRODUCTION

Monoclonal antibodies are powerful tools to explore the biochemical differentiation of the brain. We have produced a library of monoclonal antibodies against polypeptide antigens of the rat cerebellum, one of which, mabQ113, selectively stains a subset of Purkinje cells in the cerebellar cortex¹³. Immunoreactive cells are arranged into regular parasagittal bands which extend throughout the vermis and the hemispheres separated by similar bands of non-reactive Purkinje cells. No other cells types in the cerebellar cortex are immunoreactive. The mabQ113 antigen has been identified on Western blots as a 120 kdalton polypeptide but nothing is known concerning its function. In view of the striking immunocytochemical staining in the cerebellar cortex the distribution of the antigen was explored in other brain regions. MabQ113 immunoreactivity is

widespread throughout the brain. In particular, we emphasize here that mabQ113 selectively and uniformly stains the lateral habenula leaving the medial habenula unstained. The pattern of mabQ113 immunoreactivity is distinct from all of the previously described biochemical differentiation markers of the two nuclei and thus may serve as a useful probe for studies of habenular anatomy and development.

MATERIALS AND METHODS

For immunocytochemistry, adult Sprague–Dawley rats were deeply anesthetized with sodium pentobarbital. After surgical exposure of the heart, 75 units of heparin and 5 mg sodium nitrite were injected into the heart and, 1 min later, the animal was perfused via the left ventricle with 200 ml of PBS (0.1 M phosphate buffer, pH 7.4, 0.15 M NaCl), followed by fixation with 200 ml of ice-cold 4% paraformaldehyde.