Abstract

A role for Immune System-Released Activating Agent (ISRAA) in the ontogenetic development of brain astrocytes

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Background:

The Immune System-Released Activating Agent (ISRAA) was discovered as a novel molecule that functions as a mediator between the nervous and immune systems in response to a nervous stimulus following an immune challenge. This research investigated the role of ISRAA) in promoting the ontogeny of the mouse brain astrocytes.

Methods:

Astrocyte cultures were prepared from two-month-old BALB/c mice. Recombinant ISRAA protein was used to stimulate astrocyte cultures. Immunohistochemistry and ELISA were utilized to measure ISRAA and IFN-γ levels, IFN-γR expression and STAT1 nuclear translocation. MTT-assay was used to evaluate cellular survival and proliferation. To assess astrocyte cell lysates and tyrosine-phosphorylated proteins, SDS-PAGE and western blot were used.

Results:

ISRAA was highly expressed in mouse embryonic astrocytes, depending on cell age. Astrocytes aged seven days (E7) showed increased proliferation and diminished differentiation, while 21-day-old (E21) astrocytes depicted reversed effects. ISRAA stimulated the tyrosine phosphorylation of numerous cellular proteins and the nuclear translocation of STAT1. IFN-γ was involved in the ISRAA action as ISRAA induced IFN-γ in both age groups, but only E21 astrocytes expressed IFN-γR.

Conclusions:

The results suggest that ISRAA is involved in mouse brain development through the cytokine network involving IFN-γ.