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Neuroscience 2008

Presentation Abstract

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Title: Multiple histological markers reveal subpopulations of microglia respond differentially to excitotoxicity and corticosteroid treatment

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Abstract: Microglia constitute a diverse collection of neuroglia with multiple origins and functions. We utilized several histological methods to evaluate the response of microglial cells following treatment of C57BL/6J mice with corticosterone (CORT) and kainic acid (KA). Male mice were implanted with 35 or 100 mg/21 d release corticosterone pellets (67, and 190 mg/kg/d respectively). After seven days, mice were injected with saline or 25 mg/kg kainic acid, were scored for seizures for four hours (Racine scale), and were allowed to recover for 12 or 24 hours. Additional mice were treated for the full 21d with CORT only. Tissue was prepared for histological analysis of microglia by Iba-1 and CD11c immunohistochemistry, Griffonia simplicifolia isolectin B4 staining, or a microglial silver stain. Iba-1 staining revealed a subpopulation of microglial cells that was homogeneously dispersed throughout all brain regions and was observed in saline-injected controls. These cells displayed the morphology of resting or surveillance microglia. In regions of KA-induced neurodegeneration at 24h post-treatment, some microglial cells began a phenotypic transformation into amoeboid phagocytes. Iba-1 staining was unaffected by the lower dose of CORT, but was attenuated by the higher dose in both 21d animals and those treated with KA. Lectin stained microglia were not apparent in saline-injected control animals, but were observed throughout regions that displayed KA-induced neurodegeneration. These cells still exhibited many processes, some of which

appeared swollen with phagocytic debris. Lectin staining was also attenuated by CORT pre-treatment. CD11c immunostaining revealed microglial cells that were localized to regions of KA-induced neuronal damage. The silver stain revealed a subpopulation of microglia that was similar in distribution and morphology to those stained by Iba-1. These cells were homogeneously distributed throughout the brain and were observed in saline-injected control animals. Taken together, these data indicate multiple markers of microglial cells might be required to sufficiently evaluate the differential responses of all subtypes of this class of glial cell following a neurotoxic insult.

Disclosures: **S.A. Benkovic** , None; **J.P. O'Callaghan**, None; **D.B. Miller**, None.

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