

The Effect of Irradiation and Methylprednisolone in Spinal Cord-Injured Rats

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Spinal Cord Injury

Secondary injury mechanism

- 1. Neurogenic shock**
- 2. Ischemia and Reperfusion**
- 3. Excitotoxicity**
- 4. Electrolyte imbalance**
- 5. Immune reaction**
- 6. Apoptosis of neuron and glia**

Spinal Cord Injury

Treatment Strategy for SCI

Neuro-protection

**: Intervention of secondary injury
after acute SCI**

Neuro-regeneration

Spinal Cord Injury

Experiments Hypothesis

X-irradiation & MP in SCI

Anti-apoptotic effect

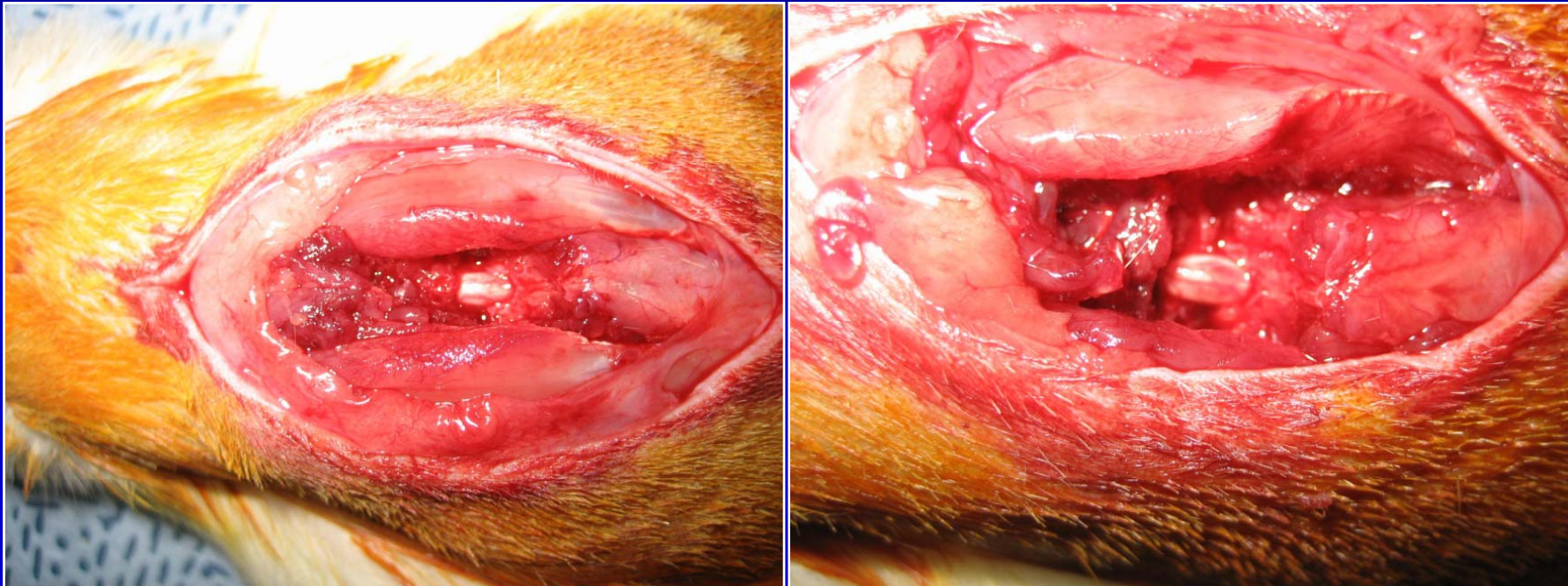
Apoptosis of oligodendrocyte

More effective treatment in SCI

Material and Method

Adult Spargue-Dawley Rat (300-350gm. Male)

- Lamincetomy at T8-10
- Contusion at T9 NYU Impactor



Material and Method

8 rats in each group

1) Control group

2) Methylprednisolone (MP)

(30 min.,6hr,24hr post SCI) & irradiation group

3) MP (30min., post SCI) & irradiation group

4) Irradiation group

****MP: 30mg/kg**

****Irradiation : 2 Gy(48 hrs. Post SCI)**

Material and Method

Tissue taking & Pathology

Area of Cystic change

**TUNEL stain and Quantification of
apoptotic cell**

**Immunoflourescent stain for
Oligodedrocyte**

Material and Method

Functional recovery assessment

Motor scale

Inclined plane test

Motor function score

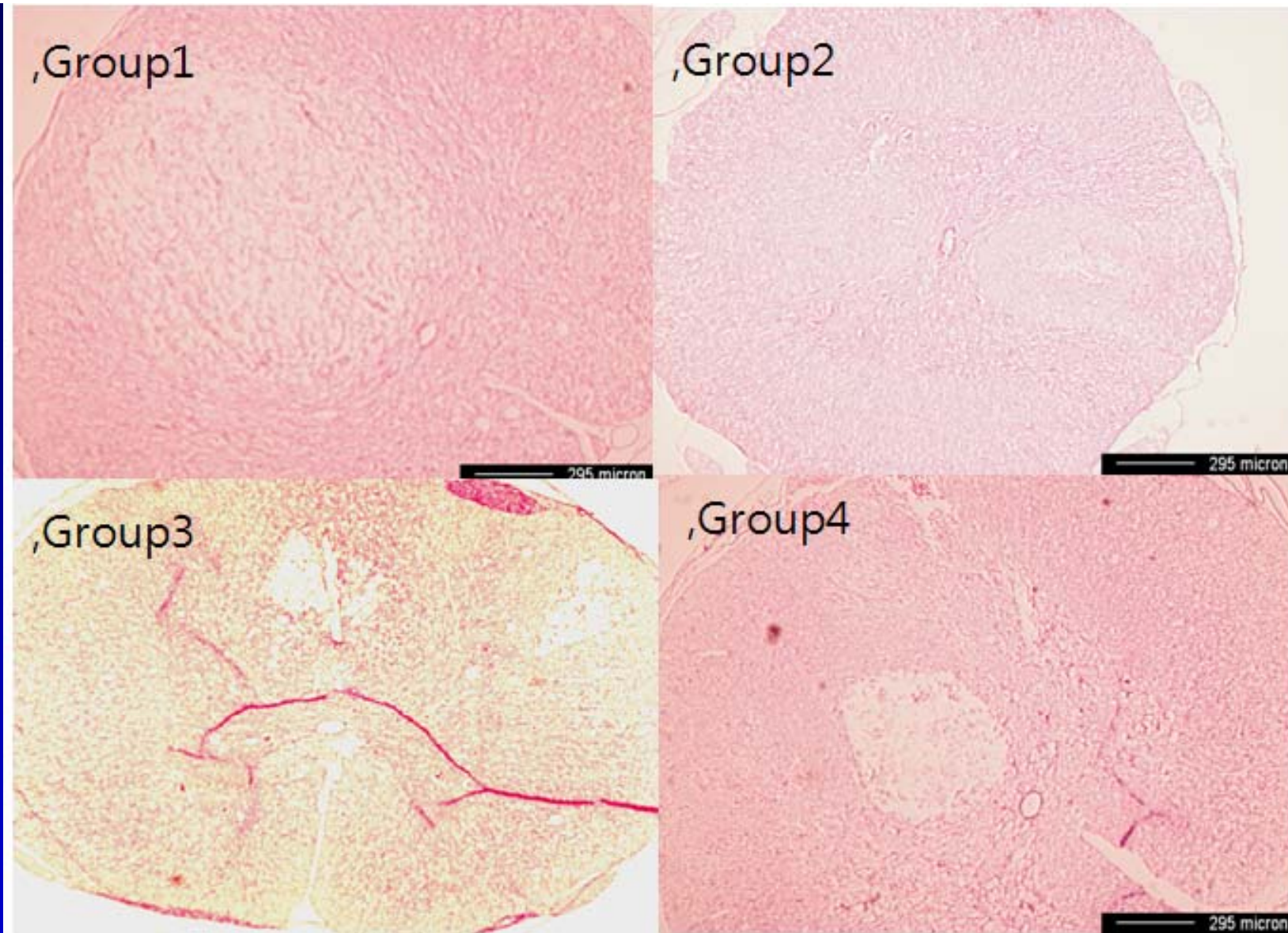
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|---|--|
| 0 | No movement of the hind limbs |
| 1 | Barely perceptible movement of hind limbs |
| 2 | Brisk movements at most hind limbs joints
(hip, knee or ankle in one or both limbs but no coordination and no weight support) |
| 3 | Alternative stepping and propulsive movements of hind limbs and no weight support |
| 4 | Can support weight on hind limbs |
| 5 | Walks only mild deficit |
| 6 | Normal walking |
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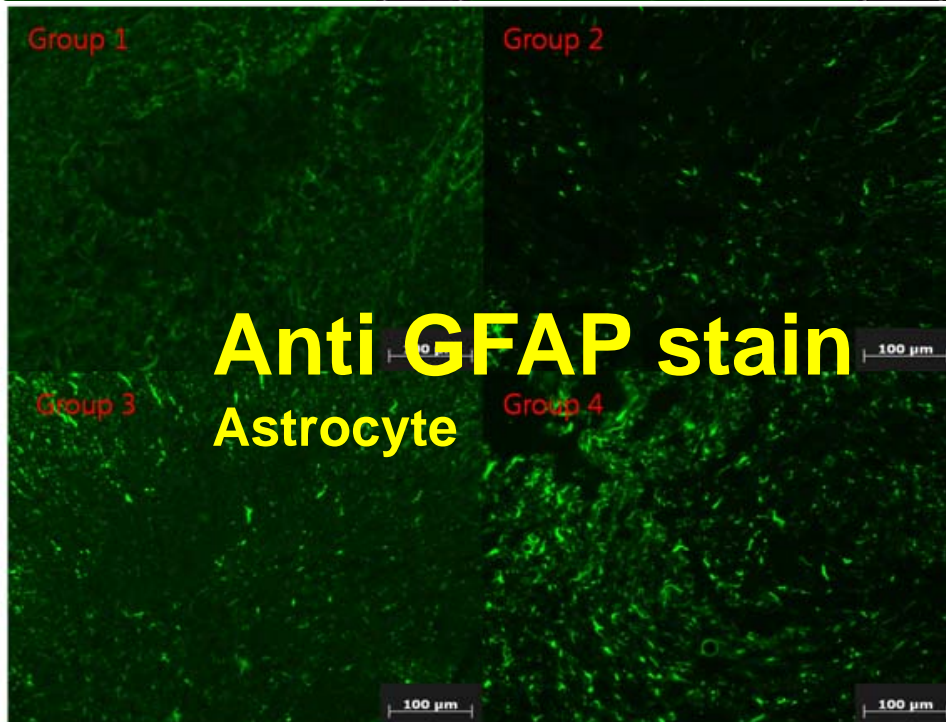
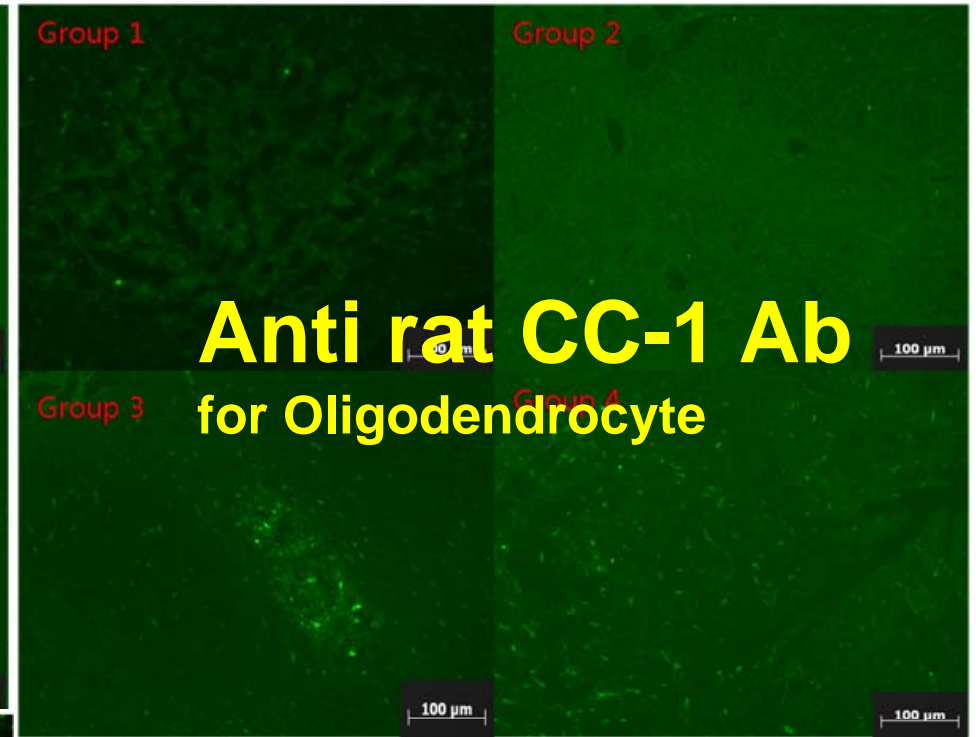
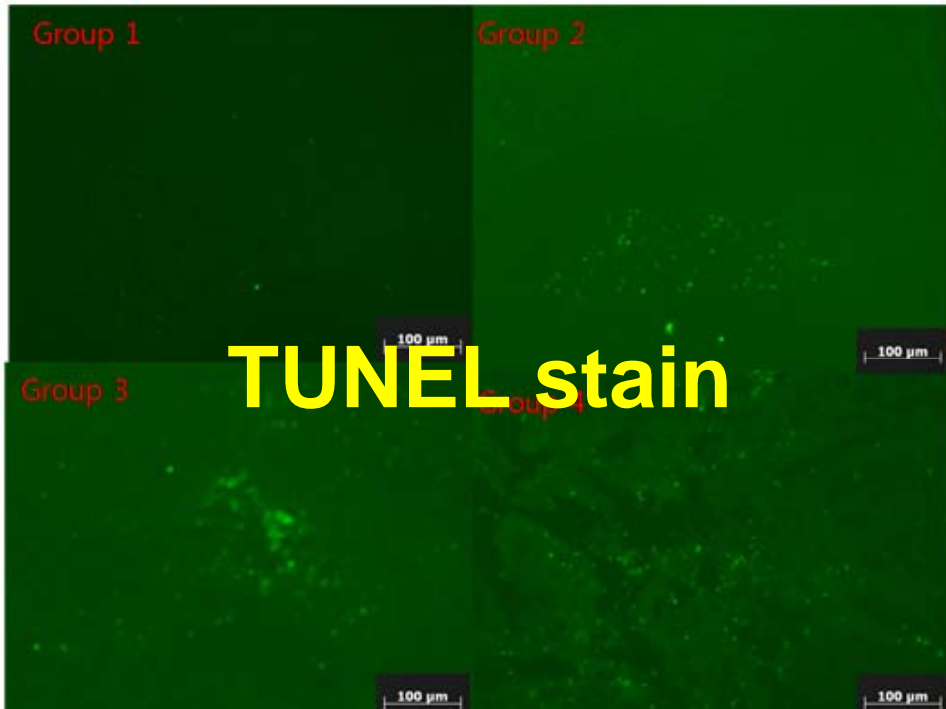
Results

Mean motor function score with time

	group 1	group 2	group 3	group 4
motor function test	1.62 ± 0.74	3.00 ± 1.06	2.62 ± 0.74	1.87 ± 0.99
inclined plan test	14.75 ± 4.33	37.12 ± 7.37	29.25 ± 5.72	21.00 ± 5.95



Photomicrographs of the epicenter of a spinal cord lesion. Cystic lesions were usually located in the dorsal column. Cystic size was greater in the control group 1 than in the other three groups 2, 3, 4 ($\times 40$).



Conclusion

- **Irradiation and Corticosteroid were Neuroprotective after Traumatic SCI.**
- **It Results from the Reduction of Apoptosis of Neuronal and Glial cells and Inflammatory Reaction.**

None of the authors has any potential conflict of interest