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The IL-4/PPAR\(\gamma\) signaling axis improves white matter integrity after stroke by promoting oligodendrocyte differentiation

FINANCIAL DISCLOSURE:
No relevant financial relationship exists
The IL-4/PPARγ Signaling Axis Improves White Matter Integrity After Stroke By Promoting Oligodendrocyte Differentiation

Xiaoming Hu
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IL-4 deficiency impairs long-term sensorimotor and cognitive deficits after stroke

Liu, X. et al. Stroke 2016
Wide distribution of IL-4 receptors CNS cells and infiltrated immune cells
IL-4 deficiency impairs white matter integrity after ischemic brain injury

Unpublished Data
IL-4 deficiency impairs white matter integrity after ischemic brain injury

<table>
<thead>
<tr>
<th>MBP/NFH</th>
<th>Control</th>
<th>LPC 3 days</th>
<th>LPC 7 days</th>
<th>LPC 7 days + IL-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild-type</td>
<td><img src="image1.png" alt="Wild-type" /></td>
<td><img src="image2.png" alt="LPC 3 days" /></td>
<td><img src="image3.png" alt="LPC 7 days" /></td>
<td><img src="image4.png" alt="LPC 7 days + IL-4" /></td>
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<tr>
<td>IL-4 Knockout</td>
<td><img src="image5.png" alt="IL-4 Knockout" /></td>
<td><img src="image4.png" alt="LPC 7 days + IL-4" /></td>
<td><img src="image6.png" alt="Unpublished Data" /></td>
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IL-4 treatment improves the structural integrity of myelinated fibers after stroke
IL-4-afforded white matter protection is associated with superior long-term functional recovery after stroke.
IL-4 Treatment Promotes Oligodendrogenesis independent of microglia/macrophages

Unpublished Data
IL-4 directly stimulates OPC differentiation in primary OPC cultures. Unpublished Data

FDR<0.5; fold change >2
Unpublished Data

PPARγ is essential for IL-4-induced OPC differentiation and maturation.
PPARγ is essential for IL-4-induced OPC differentiation and maturation.
Conclusions

• IL-4 is essential for white matter repair after stroke.
• IL-4 directly promotes OPC differentiation into mature oligodendrocytes in a PPARγ-dependent manner.
• IL-4 treatment enhances white matter integrity, improves long-term functional recovery, and may represent a novel strategy for stroke treatment.
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