Fasudil

Mechanism, Clinical Uses, and Therapeutic Potential

1. What is Fasudil? Fasudil is a **selective ROCK inhibitor**, an enzyme involved in cytoskeletal regulation, smooth muscle contractility, and vascular function. Initially developed for treating **cerebral vasospasm** after subarachnoid hemorrhage (SAH), it has shown potential for various **neurological and cardiovascular** conditions.

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2. Mechanism of Action Fasudil inhibits **Rho-kinase (ROCK)**, leading to several beneficial effects: **Vasodilation:** Reduces smooth muscle contractility, improving blood flow. **Neuroprotection:** Decreases apoptosis and promotes neuronal regeneration. **Cytoskeletal modulation:** Prevents fibrosis and pathological tissue stiffening. **Anti-inflammatory effects:** Reduces immune cell activation and oxidative stress.

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3. Clinical Indications

3.1. Approved Uses (Japan & China) **Cerebral vasospasm after SAH** → Approved in Japan & China. Improves cerebral perfusion and reduces secondary ischemia.

3.2. Investigational Uses **Ischemic stroke** → Potential neuroprotective and recovery-enhancing effects. **Pulmonary hypertension** → Reduces pulmonary vascular resistance. **Neurodegenerative diseases (Parkinson’s, Alzheimer’s, ALS)** → Anti-apoptotic and anti-inflammatory effects in experimental models. **Spinal cord injury & axonal regeneration** → Inhibition of the RhoA-ROCK pathway promotes neuronal growth. **Glaucoma** → Reduces intraocular pressure by improving aqueous humor drainage.

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4. Side Effects & Limitations Generally well-tolerated. **Possible adverse effects:** - Hypotension - Nausea and vomiting - Headache - Rare liver enzyme elevation

 Limitations: - **Intravenous administration**, limiting outpatient use. - **Not yet approved** in the U.S. or Europe for broader indications.

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5. Future Perspectives **Development of oral formulations** to enhance accessibility. **Clinical trials for neurodegenerative and fibrotic diseases.** **Combination therapies** to optimize effects in nerve injury and vascular diseases.

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6. Conclusion Fasudil is a promising drug with **vasodilatory, neuroprotective, and anti-inflammatory** properties. While currently approved mainly in Asia for **cerebral vasospasm**, its potential applications in **neuroprotection, pulmonary hypertension, and nerve regeneration**

make it a key candidate for future therapeutic advancements.

 Would you like more details on recent studies or its mechanism in a specific disease?