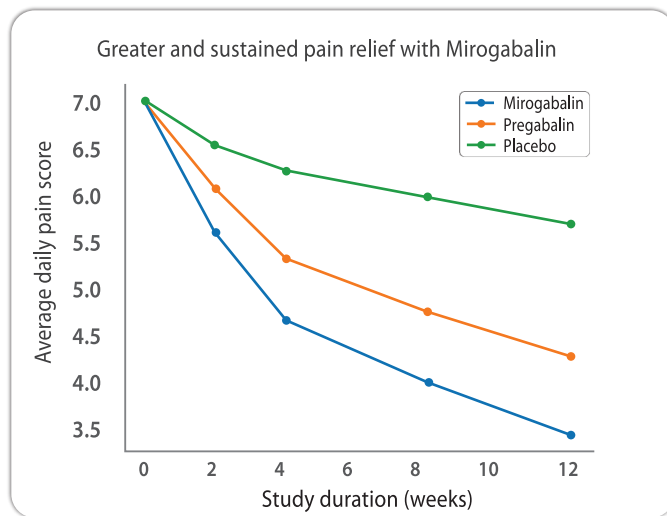
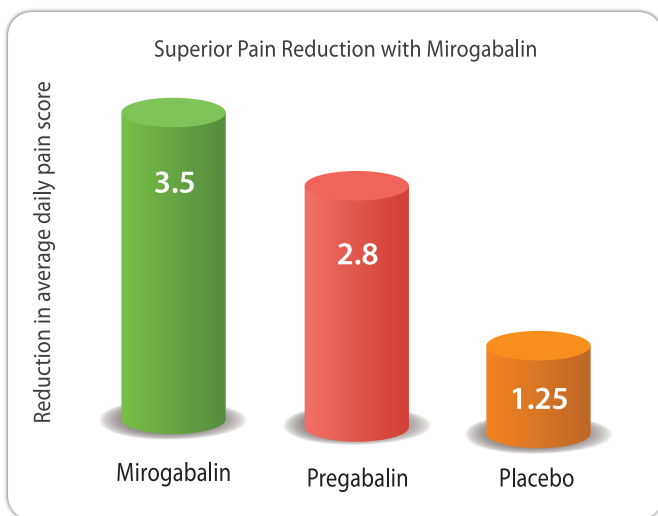


# Mirogabalin: The next generation gabapentinoid for neuropathic pain

- ❄ Gabapentinoids are the cornerstone therapy for neuropathic pain, acting via modulation of  $\alpha 2\delta$  subunits of voltage-gated calcium channels (VGCCs).
- ❄ Conventional gabapentinoids (gabapentin, pregabalin) bind non-selectively to  $\alpha 2\delta$ -1 and  $\alpha 2\delta$ -2 subunits, leading to central nervous system (CNS) adverse effects such as dizziness, somnolence, and ataxia.
- ❄ Mirogabalin besylate is a novel gabapentinoid with high affinity and slow dissociation from  $\alpha 2\delta$ -1 subunits (analgesic site) and low affinity with rapid dissociation from  $\alpha 2\delta$ -2 subunits (CNS side-effect site).

Population	Center	Indication	Comparators	Result
~1,700 patients	Japan, Taiwan, South Korea, Malaysia	Neuropathic pain (DPNP, PHN)	Mirogabalin Pregabalin, Gabapentin	Mirogabalin demonstrated greater $\alpha 2\delta$ -1 selectivity, sustained analgesia, and fewer CNS adverse effects compared to pregabalin & gabapentin



## Conclusion

- ❄ Mirogabalin provides superior and sustained pain relief in neuropathic pain by selectively targeting  $\alpha 2\delta$ -1 subunits involved in pain transmission.
- ❄ Higher analgesic potency at lower doses enables effective pain control compared with conventional gabapentinoids, supporting improved treatment outcomes.
- ❄ With better tolerability and a wider therapeutic window, mirogabalin emerges as a preferred next-generation gabapentinoid for long-term neuropathic pain management.

Ref: Kim JY, Abdi S, Huh B, Kim KH. Mirogabalin: Could it be the next generation gabapentin or pregabalin? Korean Journal of Pain. 2021;34(1):4-18. doi:10.3344/kjp.2021.34.1.4

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# Selective. Potent. Well Tolerated



Drug Review

## Peripheral neuropathic pain:

- Neuropathic pain (NeP) (central or peripheral) is defined by the International Association for the Study of Pain (IASP) as “pain caused by a lesion or disease of the somatosensory nervous system”.<sup>1</sup>
- Peripheral neuropathic pain (PNP) in diabetic peripheral neuropathy (DPN) and post herpetic neuralgia (PHN) is a chronic and debilitating condition leading to significant morbidity and poor quality of life.<sup>2</sup>
- The prevalence of DPN is estimated at ~50% and expected to increase significantly over the next few decades.<sup>3,4</sup> After initial herpes zoster infection subsides, 6.5-18% of patients may develop PHN persists for months to years, significantly impacting quality of life.<sup>5</sup>
- An estimated 50% of patients with NeP achieve 30–50% pain relief due to suboptimal analgesia and poorly tolerated side effects.<sup>6</sup>
- Although pregabalin and gabapentin are effective in managing NeP, its tolerability limits their clinical utility in a substantial proportion of patients. Hence an effective and well-tolerated pharmacotherapy is required to address the concerns in managing NeP, especially in the gabapentinoid class.<sup>7</sup>

## Mirogabalin: selective and well tolerated analgesic for DPNP and PHN<sup>8</sup>

- Mirogabalin besylate is a gabapentinoid approved for diabetic neuropathic pain and post-herpetic neuralgia.
- It has a potent pain-modulating effect with a unique, selective, high affinity and prolonged dissociation rate for the  $\alpha_2\delta-1$  subunit of voltage-gated calcium ( $Ca^{2+}$ ) channels (VGCCs) on the dorsal root ganglion resulting in more sustained analgesia compared with traditional gabapentinoids.
- Additionally, mirogabalin has a superior adverse events (AEs) profile due to a rapid dissociation from the  $\alpha_2\delta-2$  subunit of VGCCs potentially implicated in central nervous system specific AEs.

## Mirogabalin vs Pregabalin and Gabapentin in peripheral neuropathic pain<sup>10</sup>

Feature	Mirogabalin	Pregabalin	Gabapentin
Binding Affinity	Stronger binding to $\alpha_2\delta_1$ & $\alpha_2\delta_2$	Non-selective binding to $\alpha_2\delta_1$ & $\alpha_2\delta_2$	Non-selective binding to $\alpha_2\delta_1$ & $\alpha_2\delta_2$
Dissociation Rate	Slower from $\alpha_2\delta_1$ subunit	Faster dissociation	Faster dissociation
Efficacy	Higher analgesic efficacy	Moderate efficacy	Moderate efficacy
Adverse Effects	Lower incidence of CNS adverse effects	Higher incidence of CNS adverse effects	Higher incidence of CNS adverse effects
Common Side Effects	Dizziness, somnolence, headache	Higher incidence of Dizziness, somnolence, headache	Higher incidence of Dizziness, somnolence, headache
Long-term Tolerability	Well tolerated with minimal safety concerns	Associated with higher adverse effect	Associated with higher adverse effects
Onset of action	Maximum plasma concentration is achieved in less than 1 hour	Maximum plasma concentration is achieved in 1 hour	Maximum plasma concentration is achieved in 3 hours

Ref: 1. Salvatore Caruso, Marco Iraci, Stefano Cianci, et. al. Effects of long-term treatment with Dienogest on the quality of life and sexual function of women affected by endometriosis-associated pelvic pain. Journal of Pain Research, Volume 12, 2019 – Issue 2. R. Watanajirachareonchai, S Rattanasri, C Charakorn, et. al. Postoperative hormonal treatment for prevention of endometrioma recurrence after ovarian cystectomy: a systematic review and network meta-analysis. BJOG. 2021; Jan; 128(1): 25–35; 3. Fabio Baira, Antonio Simone Lagana, Carolina Scala, et. al. Pretreatment with dienogest in women with endometriosis undergoing IVF after a previous failed cycle. Reproductive BioMedicine Online. Volume 41, Issue 5, November 2020, Pages 859-868; 4. Paul L. McCormack. Dienogest: A Review of its Use in the Treatment of Endometriosis. Drugs 2010; 70(16): 2073-2088; 5. Adolf E Schindler. Dienogest in long-term treatment of endometriosis. Int J Womens Health. 2011; 3: 175–184; 6. Klaas Heinemann, Bruno Imthurn, Lena Marions, et. al. Safety of Dienogest and Other Hormonal Treatments for Endometriosis in Real-World Clinical Practice (WIPOS): A Large Noninterventional Study. Adv Ther. 2020 May;37(5):2528-2537; 7. Thomas Römer. Long-term treatment of endometriosis with dienogest: retrospective analysis of efficacy and safety in clinical practice. October 2018 Archives of Gynecology and Obstetrics 298(4); 8. Andreas D Ebert, Lying Dong, et. al. Dienogest 2 mg Daily in the Treatment of Adolescents with Clinically Suspected Endometriosis: The VSanne Study to Assess Safety in Adolescents. J Pediatr Adolesc Gynecol. Epub 2017 Feb 9; 9. Neil P Johnson, Lone Hummelshøj, et. al. World Endometriosis Society consensus on the classification of endometriosis. December 2016 Human Reproduction.



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