

# ADVANCES IN CONTEMPORARY PHYSICS

HIGH-ENERGY, COSMOLOGY,  
AND SOFT MATTER



Dr. Syed Salman Ahmad Warsi

# **Advances In Contemporary Physics**

**High-Energy, Cosmology, and Soft Matter**

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## VIBRATIONAL DYNAMICS OF ENDOMORPHINE-2

Seema Srivastava,<sup>1</sup> Ghazala Roohi Fatima,<sup>2</sup> Shweta Srivastava<sup>3</sup>,  
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**An essential opioid peptide, endomorphine-2 has a broad range of uses in neurotransmitter release, hormone production, pain perception, and respiratory activity. Wilson and Urey Bradley force field conducted a thorough vibrational analysis utilizing the GF matrix method to comprehend the dynamical behavior of this opioid peptide. The potential energy distribution of different amide modes has been analyzed.**

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### INTRODUCTION:

All of us have an innate reliance on opioids for emotional well-being. Narcotics and internally produced Endomorphine affect the tissues by interaction with a particular membrane receptor protein on nerve cells of human. Endomorphine 1 and Endomorphine 2 both are the opioid peptides of brain that are detected earliest. They have strong selectivity and attraction towards the  $\mu$  type receptors [1]. Endomorphine-2(Tyr-Pro-Phe-Phe-NH<sub>2</sub>) has sequences that are very different from those of typical opioid peptides in mammals, like enkephalins and dynorphins. In our human bodies, endomorphin-2 (EM2) had a strong analgesic impact on the spinal dorsal horn (SDH), which had a great attraction and specificity for the  $\mu$  opioid receptor [2]. The opioid receptors are member of the G-protein-coupled receptor (GPCR) family, are known to influence how pain is perceived among other biological processes [3, 4].

According to Choi *et al.* (5), EM2's analogue [Phe(p-NH<sub>2</sub>)<sub>4</sub>] had the maximum attraction (IC<sub>50</sub>=37nm) for  $\mu$  receptors. Endomorphine-2 can take on different conformations associated with the Tyr-Pro amide linkage's cis/trans rotamers. According to M. Doi *et al.* [6], constrained or flexible constituents added at the Pro position can regulate isomerization. They discovered that the  $\beta$ -turn of leu-enkephaline is comparable to the structure of an endomorphine equivalent [(CHX<sub>2</sub>)EM2]. According to In *et al.* [7], the population ratio of EM1 in DMSO solution was 1:3 and for cis/trans rotamers, it was around 1:2.

In *et al.* [7] use molecular modeling calculations and <sup>1</sup>H NMR spectroscopy to compare the conformation of  $\mu$ -selective EM2 having free acid at C terminal in solution of DMSO. They proposed that the development of a certain bioactive conformation requires the presence of the amide group at C terminal, that renders the amino group at N-terminal in a neutral state. The