



## Hormone Analogs for Treating Hypoparathyroidism

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**WARF: P130312US03**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing parathyroid hormone analogs that may be used to study receptor affinity and treat conditions such as osteoporosis.**

### Overview

The proper functioning of cells depends on information traveling from the extracellular environment to the cytoplasm. Most signals must be conveyed via proteins that span the cellular membrane. Many of these receptor proteins do not act as simple 'on/off' switches. Rather, they behave as nuanced interpreters of molecular information.

For example, parathyroid hormone (PTH) is associated with a receptor that can take on two very distinct states. PTH shows a different affinity to the two states, leading to different biological effects. This type of selectivity is interesting because it can help shed light on cell signaling mechanisms and potentially give rise to therapeutic agents with minimal side effects.

A form of PTH (Forteo™) has been approved to treat osteoporosis.

### The Invention

UW–Madison researchers have developed backbone-modified peptide analogs of PTH (1-34) that could be used to treat hypoparathyroidism, a condition caused by decreased gland function resulting in low blood calcium levels, abnormal muscle activity and other symptoms. The analogs were generated by replacing certain  $\alpha$ -amino acid residues with  $\beta$ -amino acid residues.

The analogs were used to assess the impact of backbone modifications on receptor state-selectivity. The results show that diverse binding profiles can be achieved via this strategy and give rise to distinct behaviors *in vivo*.

### Applications

- Research tools for exploring the signaling mechanisms of PTH receptor-1
- Therapeutic peptides for treating hypoparathyroidism, osteoporosis and other medical issues associated with calcium, phosphate and vitamin D levels

### Key Benefits

- Analogues are better able to resist degradation by body's protease enzymes.
- Persist longer *in vivo* than natural PTH
- Offer more sustained calcemic effect

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### Stage of Development

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Two  $\alpha/\beta$ -peptides were selected for comparison with PTH(1-34) *in vivo*. Slightly higher potency and sustained calcemic effect were observed. The two peptides diverged significantly in their receptor-state affinities.

## Additional Information

### For More Information About the Inventors

- [Samuel Gellman](#)

### Tech Fields

- [Therapeutics & Vaccines : Musculoskeletal](#)

For current licensing status, please contact Rafael Diaz at [rdiaz@warf.org](mailto:rdiaz@warf.org) or 608-960-9847

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