



**HARNES**  
Equine Performance Science

# Velocity Delivers Carnosine Through the Skin

## THE PROBLEM

Increasing muscle carnosine has been a focus in equine research for nearly three decades. Orally feeding carnosine does not work, as it gets broken down in the blood by an enzyme called carnosinase. The standard approach to increase muscle carnosine has been feeding horses the precursor molecules that create carnosine: beta-alanine and histidine. This has led to small increases in muscle carnosine and minor improvements in recovery and performance.

Feeding beta-alanine and histidine is inefficient. It takes weeks, if not months, for this effect to occur. Most studies show that a minimum of one month of daily feeding of high doses of beta-alanine and histidine is required.

## THE SOLUTION

Delivering carnosine transdermally can circumvent the major hurdles to increasing intramuscular carnosine. However, to date, there has been little evidence to suggest this approach is possible. There are ways to send small molecules, including peptides, through the skin, through specific chemistries that take advantage of the biophysical (e.g. hydrophobicity and porous nature of skin) and physiological (e.g. active transporters) properties of the skin.

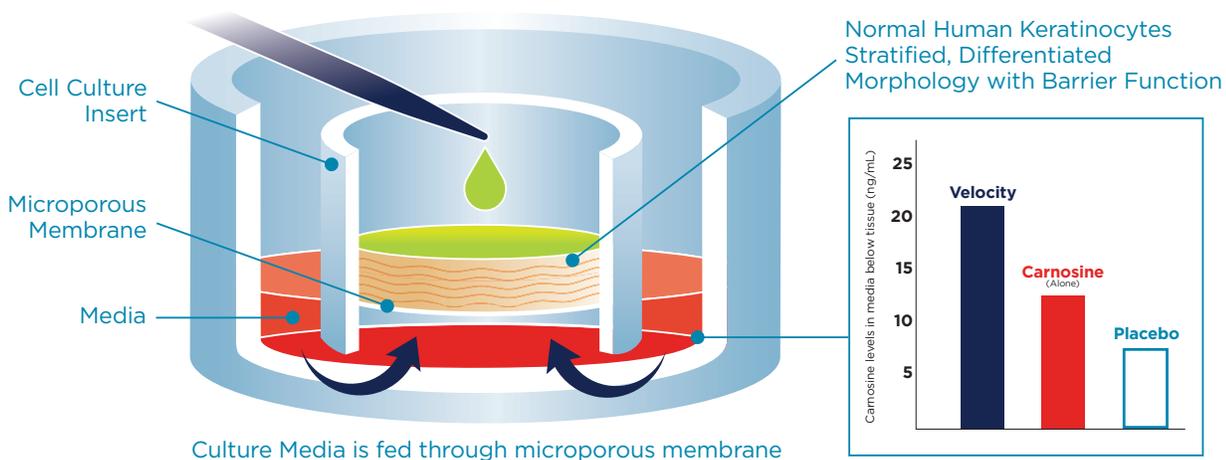
Through a novel formulation along with conjugation of carnosine to key molecules, absorption through the skin and through the dermal layers is now possible.

## THE APPROACH

In order to investigate the efficacy of transdermal delivery of a novel formulation of carnosine, a series of experiments were performed. Three different formulations were applied to a 3-D tissue: 1) The **VELOCITY** formulation that included carnosine along with the novel formulation, 2) carnosine alone, and 3) a non-carnosine containing placebo.

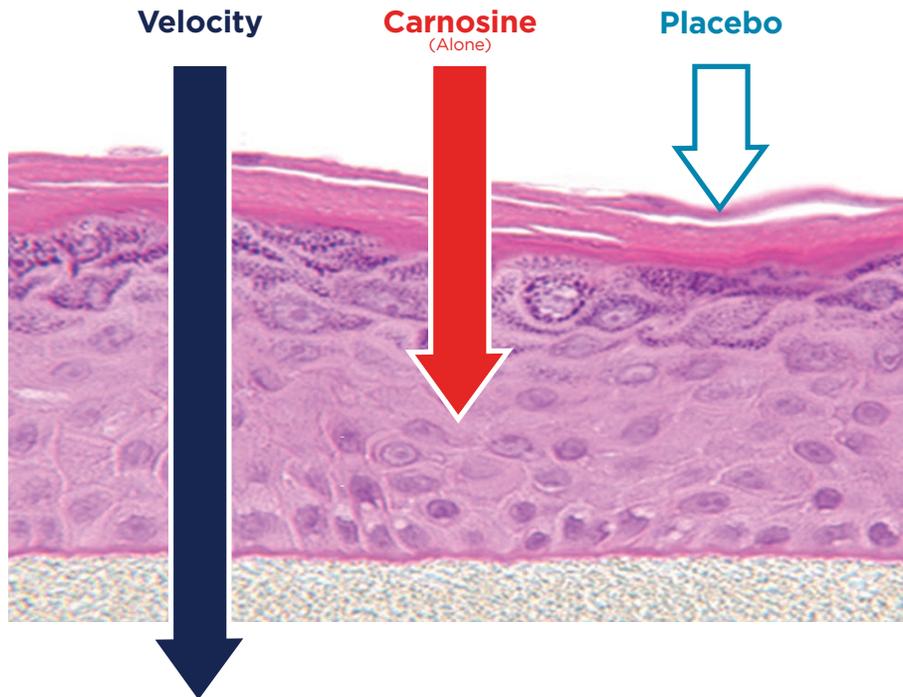
After application, the carnosine concentrations were measured in the lower layers of the skin tissue, as well as the media underneath the tissue. This approach made it possible to assess the amount of carnosine that would absorb into the skin and make it through the skin into the media on the other side, demonstrating efficacy for transdermal delivery.

## 3-D Tissue Construct Models



Continued →

Furthermore, the **VELOCITY** formulation did not increase tissue levels of carnosine after 24 hours, indicating that most, if not all, of the carnosine that was delivered made it through the dermal layers, whereas the carnosine alone saw increases, indicating that much of the carnosine stayed in the skin and did not pass through the dermal layers.



### THE RESULT

The [study](#) found that the **VELOCITY** formulation led to increases in carnosine levels on the underside of the skin, showing an almost 4-fold increase in carnosine concentrations compared to placebo, and a roughly 2-fold increase compared to carnosine alone.

### THE CONCLUSION

The **VELOCITY** formulation has been shown to deliver carnosine through the dermal layers with very high efficiency when compared to a topical carnosine alone. Furthermore, the **VELOCITY** formulation sent virtually all the carnosine through the dermal layer, whereas the topical carnosine alone resulted in much of the carnosine remaining in the dermal tissue.

View the full peer-reviewed study here: <https://www.mdpi.com/2079-9284/5/4/67/htm>

**VELOCITY**  
EQUINE PERFORMANCE & RECOVERY GEL