

## ROLE OF ARGININE IN WOUND HEALING

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**Objective:** This study aims at understanding changes in arginine metabolism and V.A.C.<sup>®</sup> therapy on chronic wound healing. Arginine is a semi-essential amino acid that plays an essential role in wound healing. A model for regulation of arginine metabolism during healing of acute and chronic wounds proposes the importance of a reciprocal regulation of nitric oxide synthase (NOS) and arginase. Arginine is metabolized to citrulline and nitric oxide via the iNOS pathway and to ornithine and proline via the arginase pathway. Proline is a precursor to collagen formation essential for wound healing. Wound fluid from the V.A.C.<sup>®</sup> is of interest when investigating the mechanisms by which V.A.C.<sup>®</sup> therapy aids in wound healing. We hypothesize that the clinical improvement in healing of chronic wounds by the V.A.C.<sup>®</sup> system occurs by a shift from a chronic cytotoxic environment to a more conducive acute healing wound environment.

**Design:** Subjects serve as their own control in this prospective quasi-experimental repeated measures design.

**Population:** Twenty subjects with pressure ulcers from nursing homes, acute care and home care settings are being studied.

**Variables:** Arginine, citrulline, ornithine and proline levels in wound fluids at baseline and at 24 hours, 72 hours and 7 days following V.A.C.<sup>®</sup> therapy.

**Methods:** Preliminary analysis of wound fluid collected from eleven patients with Stage III-IV pressure ulcers at baseline, and 24hours, 72hours, and 7 days following V.A.C.<sup>®</sup> therapy has been completed. Concentrations of arginine, citrulline, ornithine and proline were determined using high-performance liquid chromatography.

**Findings:** Arginine levels in wound fluids decreased significantly ( $p = .027$ ) from baseline following 3 days of treatment. Trends in proline levels increased at day three compared to baseline. Similarly, trends in levels of ornithine increased from baseline following 7 days of treatment. Levels of citrulline increased at 24hr and then decreased following 7 days of treatment.

**Conclusions:** The preliminary results from this study suggest that improved wound healing with V.A.C.<sup>®</sup> therapy is related to a shift from the iNOS to arginase pathway resulting in a more conducive wound healing environment.

**Implications:** This research is a critical next step in evaluating the role of arginine metabolism and V.A.C.<sup>®</sup> for enhancing wound healing in vulnerable populations.