

# Acute Training Variables, Muscle Growth, Strength, and Power - Introduction

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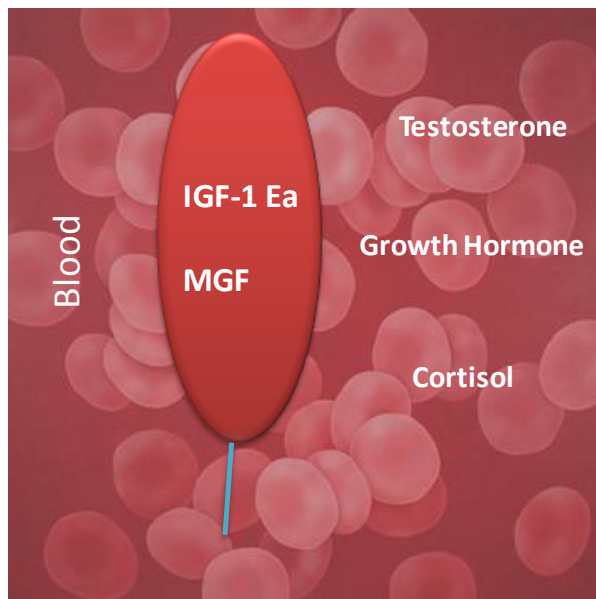
## Introduction

Since the conception of weight training millions upon millions have asked the same questions: "How can I get bigger?", "how can I get stronger?", and "what must I do to become more powerful?" Intriguingly enough I entered academia to become more proficiently equipped to answer such questions, and since that time nearly all of my papers, experiments, and lab work has been dedicated to enhancing this process. Clearly hypertrophy, strength, and power can be affected by a literally endless combination of variables, a few of which include nutrition, rest, acute (short term) and chronic (long term) training variables. This article will address the acute training variables which can be divided into (1) muscle action, (2) resistance or intensity used, (3) rest period lengths, (4) volume, (5) exercise selection, (6) exercise order, (7) repetition velocity, and finally (8) frequency of training sessions <sup>1, 2</sup>.

## Changes in Muscle Tissue Size as a Factor of Changing the Local and Surrounding Environment

Because the primary focus of this site is bodybuilding, the principle focus of this paper will be on muscle growth. Strength and power adaptations will be addressed, mainly due to their interaction with hypertrophy. To begin, it is important to realize that muscle growth, in large part, is a factor of signaling. In other words the muscle has to be signaled to increase protein synthesis (muscle building), and to lower muscle protein breakdown, as well as a host of other factors. Ultimately it is the local and surrounding environment which triggers these changes<sup>3-5</sup>.

For example, at rest your muscles are continually bathed in hormone rich blood. Hormones which increase muscle growth are testosterone<sup>6</sup>, and growth hormone (GH)<sup>7</sup>, while cortisol promotes muscle loss (Figure 1.0)<sup>8</sup>. Locally there are literally countless growth factors which increase following exercise. A few of these growth include insulin like growth factor 1(IGF-1) -Ea, and IGF 1-Ec, also known as mechanogrowth factor (MGF) because of its sensitivity to muscle contraction.



**Figure 1.0-The surrounding (blood) and local signaling environment**

Training actually causes changes in both the surrounding (e.g. blood) and local muscular environment. Therefore the optimal exercise prescription will attempt to manipulate training variables to alter the surrounding environment in favor of increased muscle growth. This is illustrated in figure 1.

## References.

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