# Hormone Signaling in BFR Training: Student Handout

## Key Concept

BFR training elevates blood lactate, stimulating growth hormone (GH) release. GH supports collagen synthesis, tendon health, and IGF-1 production. However, acute hormone spikes may not directly drive muscle hypertrophy.

## Mechanisms & Effects

- Elevated lactate stimulates GH release from the pituitary.
- GH stimulates IGF-1 synthesis in liver and muscle, enhancing satellite cell (SC) fusion and supporting hypertrophy.
- GH and IGF-1 promote collagen synthesis in tendons and skeletal muscle, strengthening connective tissue.
- Short-term low-load BFRT increases satellite cell content and myonuclear number.

## Conflicting Evidence

- Acute spikes of GH, IGF-1, testosterone, or noradrenaline may not directly mediate hypertrophy.
- Older women: GH release after 10 weeks of BFR walking did not correlate with hypertrophy.
- Young men: 15 weeks of RT designed to spike hormones showed no greater hypertrophy than RT with basal levels.
- Recombinant GH increased collagen synthesis but not muscle protein synthesis.

## Student Takeaway

BFR induces hormonal responses (GH, IGF-1, testosterone), but these appear more important for tendon and connective tissue health than direct muscle hypertrophy.

Muscle size gains are likely driven more by local muscle factors (mechanical tension, metabolite accumulation, satellite cell activation) than systemic hormone spikes.