

## Contextualization of new biological evidence on the adult stem cell's role in super-compensation and overtraining

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Adult stem cells are crucial for the repair of a variety of tissues, and also play a role in adaptation to localized stressors. Skeletal muscle tissue is highly adaptable in response to stress, such as exercise, and this adaptive capacity relies mainly on resident progenitor cells, in particular satellite cells (5). Variations in exercise training regimens (intensity, frequency and volume), influence the extent of adaptation and, when these variables are applied correctly, they may induce tissue adaptation to exercise stress (super-compensation). The incorrect application of these variables including insufficient recovery time following training may result in tissue damage due to overtraining. Human subjects underwent a single bout or repetitive bouts of eccentric exercise (plyometric jumps and downhill running) to study the role of satellite cells in super-compensation and overtraining phases (1-4). The results indicated a satellite cell pool expansion after a single bout or repetitive bouts of exercise. After a single bout, the number of satellite cells increased 1 day post-exercise, peaked 3-4 days post-exercise and thereafter declining. During repetitive bouts of exercise, the satellite cell pool expanded gradually and thereafter declined gradually to baseline values.

The proposed benefits of this phenomenon "super-compensation of satellite cells", i.e. expansion of adult stem cell pool, may be relevant for a new therapeutic approach to accelerate the healing process after surgery, pre-operative exercise.

### References

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### Keywords

Exercise; satellite cells; stem cells; skeletal muscle