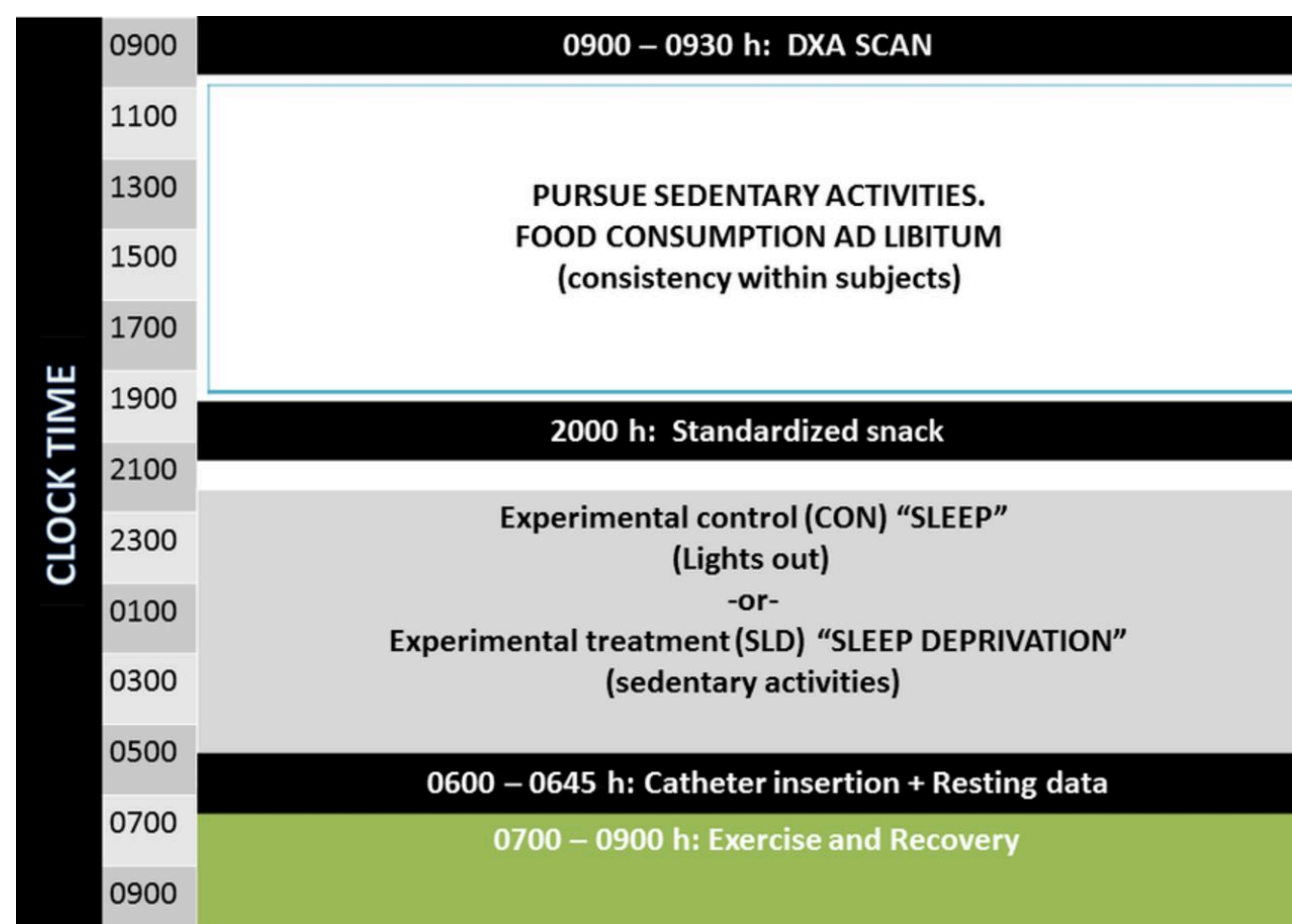


The Effects of Exercise on Sleep Deprivation

Abstract

Sleep deprivation is an accepted part of the college experience. There's a big test the next day, or a midterm paper is due and it is not going to complete itself. So naturally the college student demographic is often frequently reaching for caffeine as a quick fix while promising themselves they would sleep more this weekend. I, however, wanted to examine the physiological response the body has to sleep deprivation and what measures could be taken to either prevent or reverse said effects.

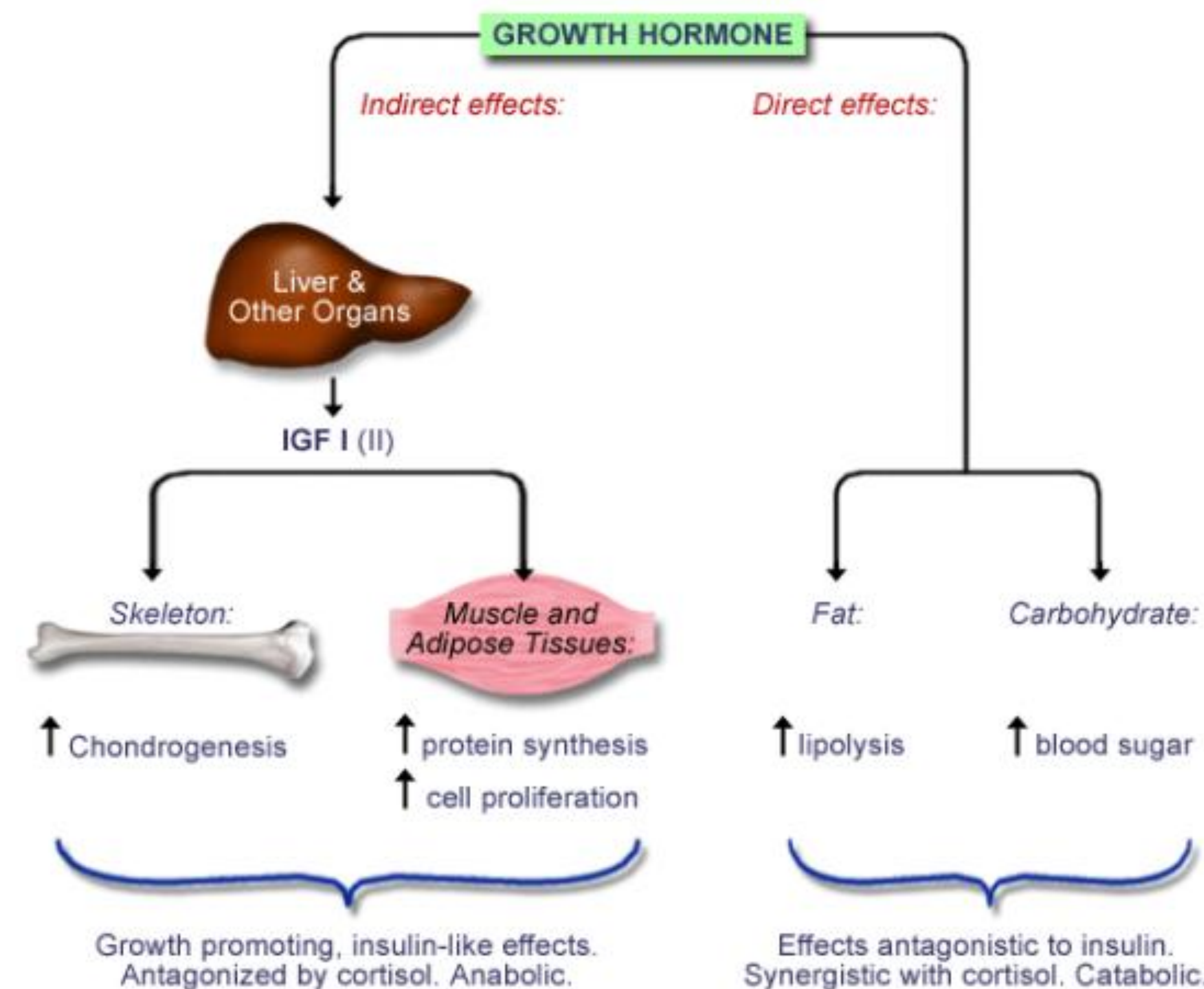
The Study



Blood samples were collected before, during, and after exercise in order to determine the hormone levels in the blood. College aged men in North Carolina were tested in this study. All were previously averagely fit.

Effect of Sleep Deprivation

Growth Hormone (GH) is a major hormone affected by sleep deprivation. GH is released from the anterior pituitary gland and affects multiple areas around the body:



The largest release of GH normally occurs shortly after the onset of sleep continuing for the first four hours of sleep. By not sleeping the concentration of GH can become low; the body has to compensate by sporadically releasing GH throughout the day.

However it is also known that exercise causes the release of GH. This study examines if exercise could assist in stabilizing the levels of GH in the bloodstream, thus helping sleep deprived individuals steady at least one hormone.

The Results

Variable	SLEEP	SLD	P
Resting GH ($\mu\text{g/L}$)	0.57 ± 0.13	1.35 ± 0.55	0.181
Peak GH ($\mu\text{g/L}$)	17.8 ± 3.7	39.6 ± 7.1	0.002*
Time to Peak GH (min)	29.5 ± 2.2	27.0 ± 1.5	0.299
ΔGH ($\mu\text{g/L}$)	17.2 ± 3.7	38.2 ± 7.3	0.003*
GH AUC ($\mu\text{g/L/min}$) ¹	825.0 ± 199.8	2212.8 ± 441.9	0.001*

The SLD varied vastly in the amount of GH released; almost double the GH was released as opposed to the control group, with a P-value of .002 showing significance. This means that exercise after sleep deprivation greatly increased the amount of GH released.

Conclusion

The initial research shows that exercise could be used in order to offset some of the side effects of low levels of GH. While more research needs to be done the groundwork has been laid to potentially help sleep deprived students and professionals.

This information is from the research article *Exercise-Induced Growth Hormone During Acute Sleep Deprivation*. Research was performed by Kevin Ritsche, Bradly Nindl, and Laurie Wideman