

The Effects of UV-B Light on Serum Vitamin D levels in Humans

L. A.G. Armas, R. P. Heaney, M.J. Barger-Lux, C. Huerter, R. Lund, Creighton University, Omaha, Nebraska

We report results of vitamin D levels after 4 weeks of exposure to graded doses of UV-B light delivered by a light booth. The subjects (n=69, age 19-49 yr, females = 41, males =28) were indoor workers with limited non-solar sources of Vitamin D.

The subjects had 90% of their body exposed to broad-band UV-B light from a UV light booth 3 times a week for 4 weeks (12 treatments) in doses ranging from 20mJ to 80mJ per treatment. Serum Vitamin D was drawn at baseline, after 4 weeks of UV-B treatment, and again 4 weeks after completion of UV-B treatment.

At baseline, 80% percent of the subjects had undetectable vitamin D levels. The subjects' median serum vitamin D level was 0 nmol/L (0, 0 interquartile range). At 4 weeks, after 12 treatments with UV-B light, the median vitamin D level was 31.0 nmol/L (19.0, 42.5 interquartile range). Four subjects' vitamin D levels remained at 0 after UV-B treatment despite a median rise in their 25(OH)D levels of 26.6 nmol/L..

At week 8, the median vitamin D level decreased to 0 nmol/L (0, 5.9 interquartile range) with 57% of subjects' levels reaching 0 nmol/L.

The vitamin D response to UV-B light correlated positively with dose of UV-B light and the 25(OH)D level.

In conclusion, serum vitamin D levels increase in response to UV-B light, but the body needs constant vitamin D input to maintain vitamin D levels. The serum vitamin D levels are quickly depleted by either storage by the body or conversion by the liver to 25(OH)D.