



**Universität  
Zürich**<sup>UZH</sup>

**Institut für Hausarztmedizin**

**Oral vitamin D – Is it necessary to be taken with meals containing fat?**  
An Open-Label, Crossover Study

Markus Gnädinger, Frank Bossert, Felix Eichmann, Bruno Haug, Martin Krüsi, Markus Nadig, Stefan Pazeller, Theo Ringli, Martin Ruppli, Michel Salzgeber, Ivo Schmid, Roman Schöb, Bernhard Wälti, Markus Zeller  
*Quality Circle Oberthurgau, Switzerland*

**Summary**

Vitamin D is highly apolar and belongs to the class of fat-soluble vitamins. It is suggested to take them with meals containing fat to enhance their intestinal resorption. However, there are only a few controlled studies which investigate postprandial inferences on its resorption.

**Subjects and Methods**

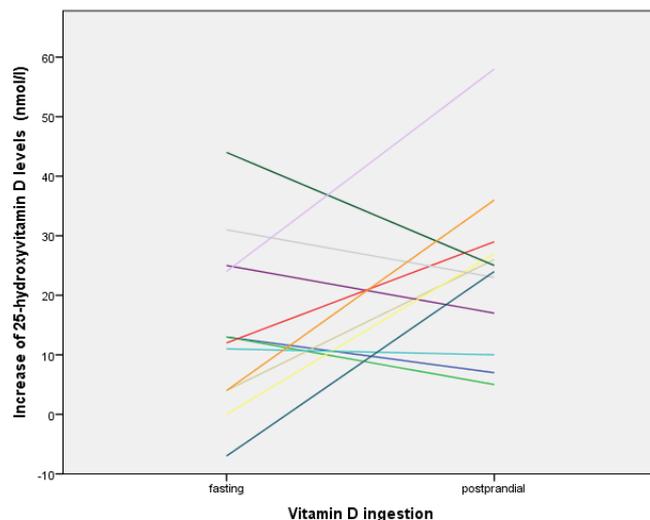
Within a group of general practitioners, during a period of three months, we ran two identical study protocols during winter and early spring time. Blood was taken from the subjects, 60'000 units of vitamin D (cholecalciferol) was ingested, and blood sampled once again a week later. One time the vitamin was ingested postprandial, and another time in a fasting state. 25-hydroxyvitamin D was determined by ADVIA CENTAUR vitamin D total.

**Results**

Age, years	54 (51;57)
Body mass index, kg/m <sup>2</sup>	23.1 (21.8;24.4)
Blood pressure, mmHg	129 / 84 (119;140 / 78;89)
Heart rate, min <sup>-1</sup>	68 (62;74)
Serum calcium, mmol/l	2.39 (2.33;2.44)
Serum phosphate, mmol/l	1.1 (1.0;1.2)
Serum albumin, g/l	44 (43;45)
25-hydroxyvitamin D, nmol/l	41.1 (32.4;50.0)
1,25-dihydroxyvitamin D, ng/l	38.1 (31.7;44.5)

**Table: Basal values of participants** (mean value, 95% confidence interval)

The basal levels of 25-hydroxyvitamin D were 41 (32;50) nmol/l (mean, 95% CI). When the supplement was ingested in a fasting state, serum 25-hydroxyvitamin D was increased by 15 (5;24), while taken after a meal containing fat, the rise was 23 (15;33) nmol/l (n.s., p=0.13). The other parameters which were tested were unchanged throughout the study: calcium, phosphate, albumin, 1,25-dihydroxyvitamin D (calcitriol).



**Figure: Individual increases of serum 25-hydroxyvitamin D after 8 days as compared to pre-dosage levels (n=12)**

**Discussion**

The results of our study do not support major influences on vitamin D resorption by the influence of fasting vs. concomitant fatty meal intake. Resorption of vitamin D seems to be unpredictable – fractionate dosage and determination of serum levels during treatment may be helpful. Unexplained low vitamin D after repeated supplementation could be due to intestinal disease, mainly celiac.

Correspondence: [markus.gnaedinger@hin.ch](mailto:markus.gnaedinger@hin.ch)