



## Vitamin B12 Study

We conducted a single-dose, crossover study in six human subjects of two dosage forms of vitamin B12 – a liposomal liquid and a liposomal powder-filled capsule. Equivalent doses were given one time. Serum B12 measurements were conducted at baseline, then at 45 minutes, 75 minutes, and 135 minutes after dosing. Each subject was given 3 mg of vitamin B12 in one dosage form, followed by a washout period of 14 days, then dosing with the other dosage form.

Baseline B12 levels were, as expected, different between subjects. All subjects (with one exception) had an increase above baseline at one or more time points. Comparing the different dosage forms, the capsule performed better than the traditional liquid in five of six subjects. The one subject with an abnormally high baseline prior to liquid dosing was the only outlier.

All subjects had serum B12 increases after taking the capsule formulation at T45, then all but one had increased at T75 and T135, but not in a linear fashion. This might be due to the normal pharmacokinetics of oral vitamin B12 intake, as there is a significant and complex intestinal enterocyte uptake, transport, and enterohepatic circulation of this vitamin.

On average, the serum B12 in five of six subjects in this study increased six-fold after taking a LipoCellTech™ liposomal capsule compared to the traditional liposomal liquid when comparing the highest peak of each subject's serum B12.

### B12 tablet vs Traditional Liposome vs LipoCellTech

