**Curcumin Extract for Prevention of Type 2 Diabetes
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Introduction**
This study investigates the effect curcumin produces against diabetes in pre-diabetic individuals.

**Methods**- Randomized Controlled Trial, Double Blind, Between Subjects Design
- 12 month study (but had a 3 month teaching period – how to exercise, nutrition, etc.)
- Had 242 participants, separated between curcumin and placebo groups.
 - Participants were prediabetic and over the age of 35.
- Both groups consumed 3 capsules, 2x a day.
 - Curcumin capsules contained a total of 1.5g (250mg curcumin per capsule).
- Curcumin was purified from dried rhizomes of turmeric so that curcumin made up 75-85% of powder in capsules. Verified by chromatography.
- Measured at baseline (study start), 3, 6, and 9 months.
- Measured bodyweight by tape measure.
- Cardiovascular markers/BP checked by going into doctor visit records.
- Electrocardiograms (ECG)
- Blood Pressure taken
- Blood taken for blood markers (like glucose and insulin and others).
- Oral Glucose Tolerance Test used to find glucose and insulin sensitivity (at baseline & at 9 months only).
- Radioimmunoassay for insulin, c-peptide, and adiponectin, and other measures.

**Results**

*Table 1*
This table shows the baseline (before the study begins) differences between the two groups (Placebo vs Curcumin)
- There are no statistically significant differences between the groups.

Take away: Whatever outcomes come from the curcumin intervention, they are unlikely to be caused by pre-study confounding variables.

*Table 2*
This table shows the differences, over time (3,6, 9 months), of the curcumin supplementation on a variety of outcomes. This is a between groups comparison (curcumin vs placebo, at various time points).

- Bodyweight is decreased, after 9 months, with curcumin vs placebo (placebo even increases weight).
- Fasting plasma glucose (FPG) is significantly decreased to non-prediabetic levels at all time points (3,6, 9 months).
- Oral Glucose Tolerance Test shows better glucose/blood sugar tolerance in the curcumin group at all time points.
- HbA1c is shows similar benefit in the curcumin group at all time points.
- Insulin levels are also lower for the curcumin group, at 9 months.
- Beta Cell activity is also improved (closer to 100%) after 9 months (incorrectly labeled as 3 months) with the curcumin group.
- Adiponectin is elevated after 9 months in the curcumin group.

Take away: Curcumin seems to have subtle and dramatic impact on a variety of health measures at 3, 6, and 9 months, but especially after 9 months.

*Figure 1*This figure simply shows a graphic depiction of information shown numerically in Table 2. No new information.

*Table 3*
This table shows how many of these pre-diabetic participants, at the end of the study, were diagnosed with diabetes.
- None of the curcumin group were diagnosed with diabetes, yet 19 of the placebo group were diagnosed with diabetes at 9 months.

Take away: More evidence, albeit less direct, that curcumin protects against diabetes.

*Additional Notes*:

- There were no serious adverse effects with curcumin supplementation.

- People sometimes forgot to consume capsules, but comparing both groups, similar numbers of forgotten capsules were retrieved.

**Conclusions**

- Curcumin reduces the risk of tipping from pre-diabetes to diabetes.

- Curcumin supplementation improves glucose tolerance/clearance at a lower insulin level, implying greater insulin sensitivity.

- However, both of these effects may be dependent on weight loss (due to an indirect or direct impact of curcumin; considering the curcumin group lost an average of 3.9 kilograms / 8.6 lbs)