

# Diabetes and Exercise

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## Introduction

- Pancreas releases hormones in response to the body's sugar level.
- Insulin is released by the beta cells when the blood sugar level is high.
- Glucagon is secreted when the blood sugar level is low, it tells the liver to release stored glucose.
- Those hormones try to maintain the blood sugar level between 70 mg/dl and 110 mg/dl.
- Many complications may result from diabetes, heart disease, high blood pressure, blindness, kidney diseases.

## Introduction Continued

- Type I diabetes, occurs in younger adults and results when the pancreas doesn't produce insulin.
- Type II diabetes, occurs in middle age older adults and results when not enough insulin is produced.
- Exercise is a great way to treat and manage diabetes.
- Exercise enhances body's ability to use glucose, it also causes weight loss, decreases cholesterol and lowers blood pressure.
- The purpose of this experiment is to examine the effects of exercise on people with diabetes.

## Hypothesis

- The body will be able to better absorb glucose and maintain the blood sugar level at a comfortable range (between 70mg/dl and 110mg/dl).
- Exercise will improve the subject's fitness, lowering the risks of diabetes.
- Exercise will decrease the need for injections of insulin.

## Methods

- A diabetic training for a marathon.
- The training includes a series of long and short distance running.
- The blood sugar level is recorded several times during the race.
- Insulin injections are recorded, as well as nutritional information on non training days.

## Methods Continued

- Puncture the skin.
- Place the blood sample on the strip of the glucose testing device.
- After 5 seconds the device will display the blood sugar level.
- Injection of insulin: 2 types humalog and lente.
- Injected into the fat part of the body.

## Evidence



Marathon in Philadelphia on November 21<sup>st</sup> 2004.



Keeping a steady pace throughout the race.

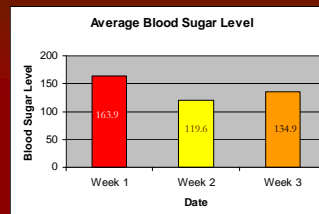


Crossing the finish line after a 26.1 mile course.



The award ceremony.

## Results



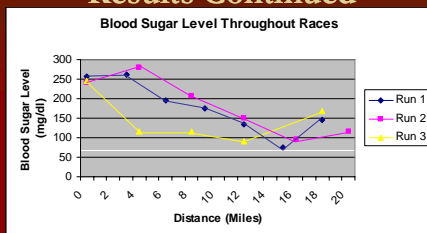
**Notes:**

**Week 1:** (11/10 – 11/16) Lots of eating, very little exercise.

**Week 2:** (11/17 – 11/23) Marathon Week, lots of running (includes a 26 mi run)

**Week 3:** (11/24 – 11/30) Little exercise, lots of eating and no cardio activity.

## Results Continued



**Notes:** Pre race meal before every run. A bagel with butter.

**Run 1:** At 12 miles pop tart was taken and at 15 miles gummy sours were taken.

**Run 2:** At 16 miles 1 CU energy gel was taken.

**Run 3:** At 8, 12, and 14 miles Powerbar Energy Gel was taken. Also previous night before the run, 2 hours of intense hockey was played.

## Conclusions

- The test subject is able to lower the blood sugar level without insulin.
- Exercise improved the diabetic's fitness lowering the risks.
- With exercise the subject was able to lower his average blood sugar level to a comfortable range.

## Future Studies

- Expand my study by increasing the number of test subjects with both types of diabetes.
- Based on my research many sources predicted that type II diabetes can be controlled with a regular exercise program and a healthy diet. Test whether it is true.
- Test people with diabetes with different forms of exercise. How much exercise is needed in order to improve or treat diabetes?