Low Insulin Lifestyle - Audio Book Reference Guide

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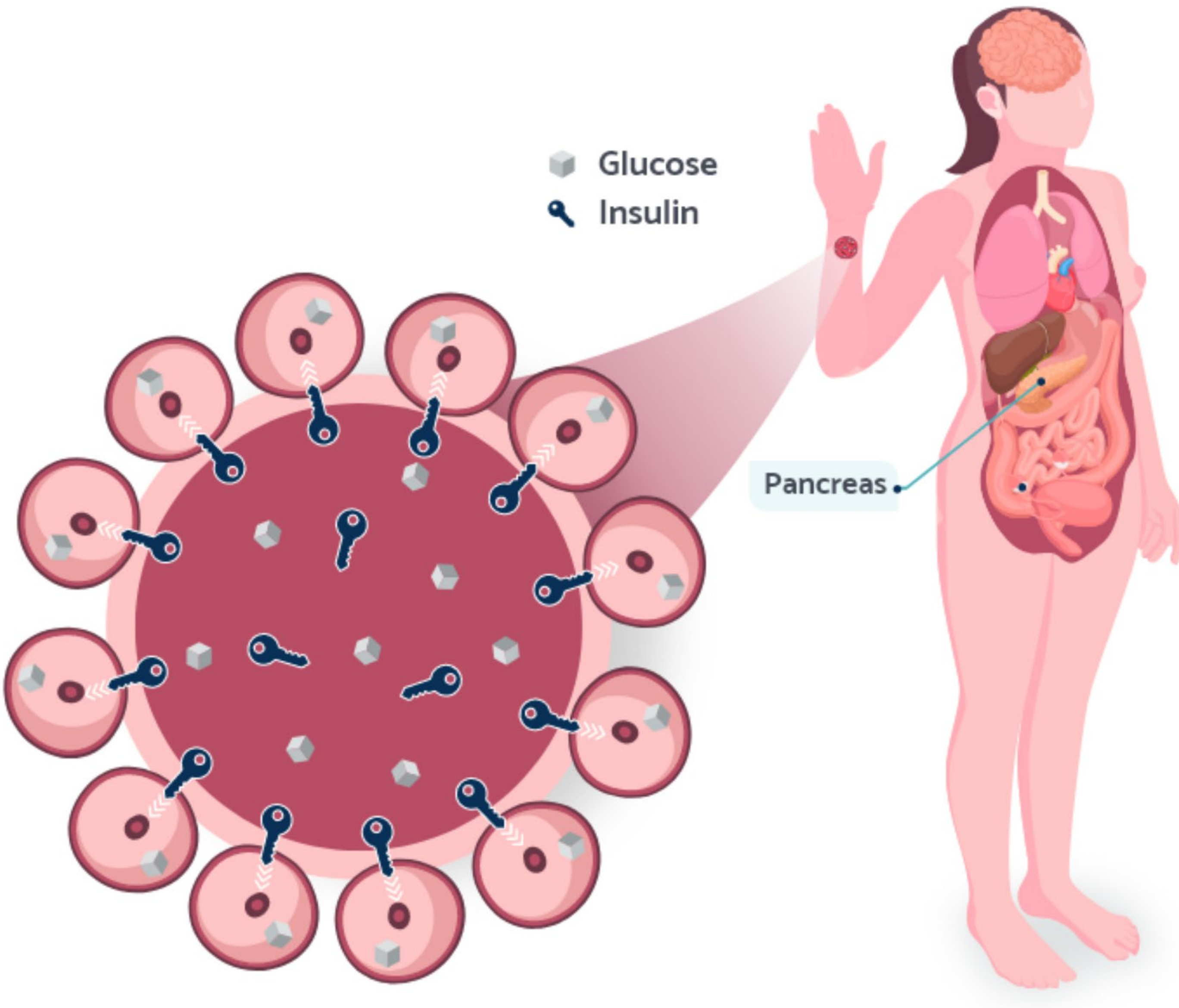
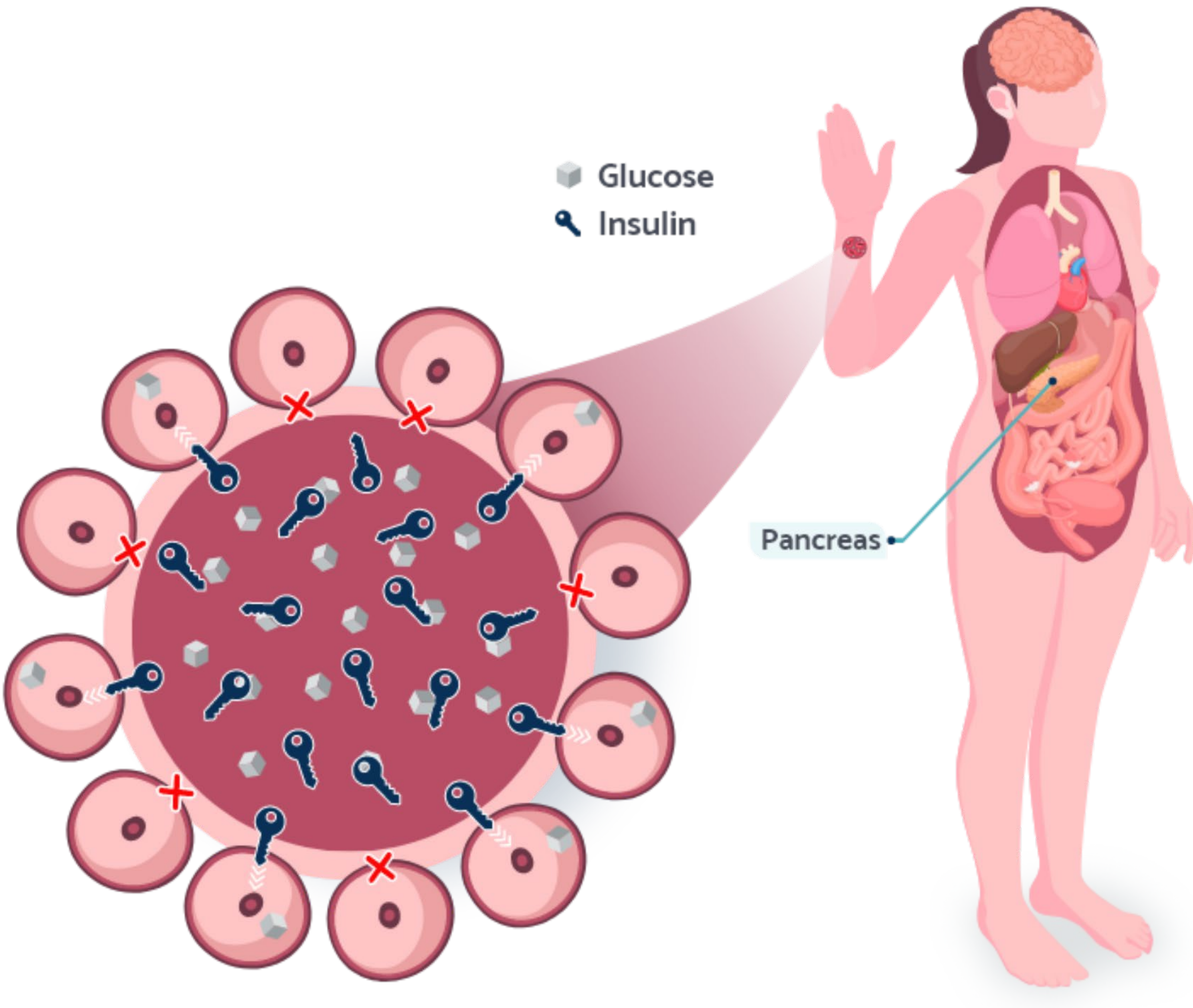
CHAPTER 1 – UNDERSTANDING INSULIN AND INSULIN RESISTANCE

HEALTHY METABOLISM



A healthy metabolism is one where insulin is secreted by the pancreas after a meal, helping to transport glucose into the cells, and then levels in the blood come back down to normal until the next meal. In this figure you can see that insulin (key) is unlocking the cells to allow glucose (sugar cube) to enter. Blood sugar levels in the blood are normal and insulin levels are low.

INSULIN RESISTANT METABOLISM

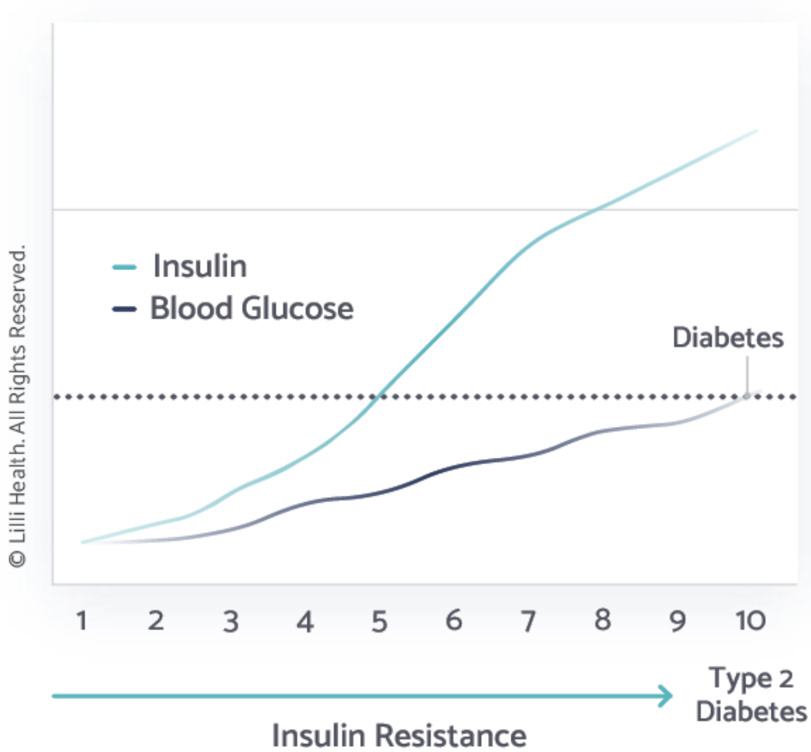


When someone is insulin resistant, the cells don't respond to insulin and it's more difficult to get glucose into the cells. This leads insulin to build up in the blood because the pancreas keeps secreting more insulin to help get glucose into the cells. Someone who is insulin resistant may have normal blood sugar levels because their insulin is still working well enough to get the glucose into the cells – it just takes more insulin to get the same job done.

In the figure you can see that insulin (key) is not working in some of the cells. These cells are resistant (X) to insulin and aren't allowing glucose (sugar cube) to enter. This is a simplified explanation to a highly complex process, but it's meant to give you a visual.

The Difference Between Insulin Resistance and Type 2 Diabetes

THE WORK-A-HOLIC PANCREAS

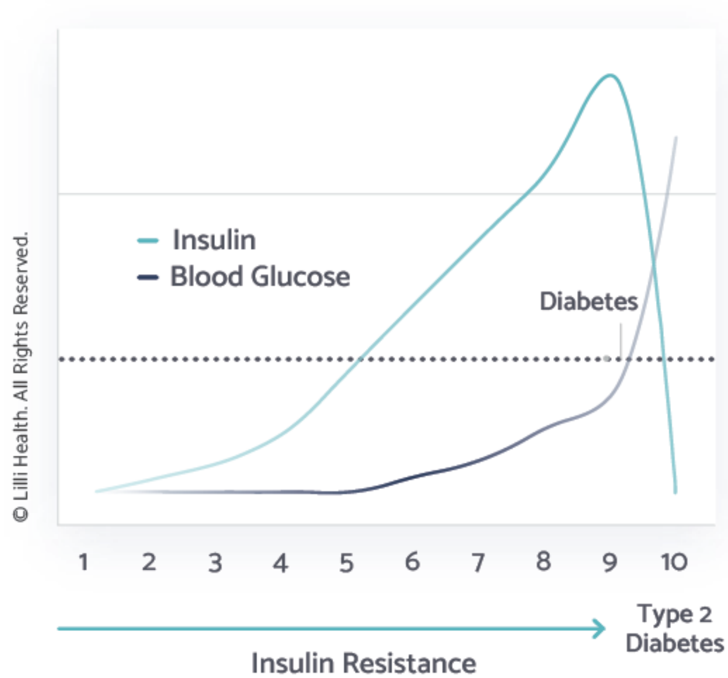


THE WORK-A-HOLIC PANCREAS

The majority of adults have what I like to call a work-a-holic pancreas. Individuals with a work-a-holic pancreas often have high insulin levels for years or even decades before their blood glucose reaches a level that results in a diagnosis of type 2 diabetes. In this graph, the dotted line represents a blood glucose level that would result in a diagnosis of type 2 diabetes.

This graph shows why only testing blood glucose and hemoglobin A1c isn't enough to determine if someone is insulin resistant.

THE RETIRED PANCREAS

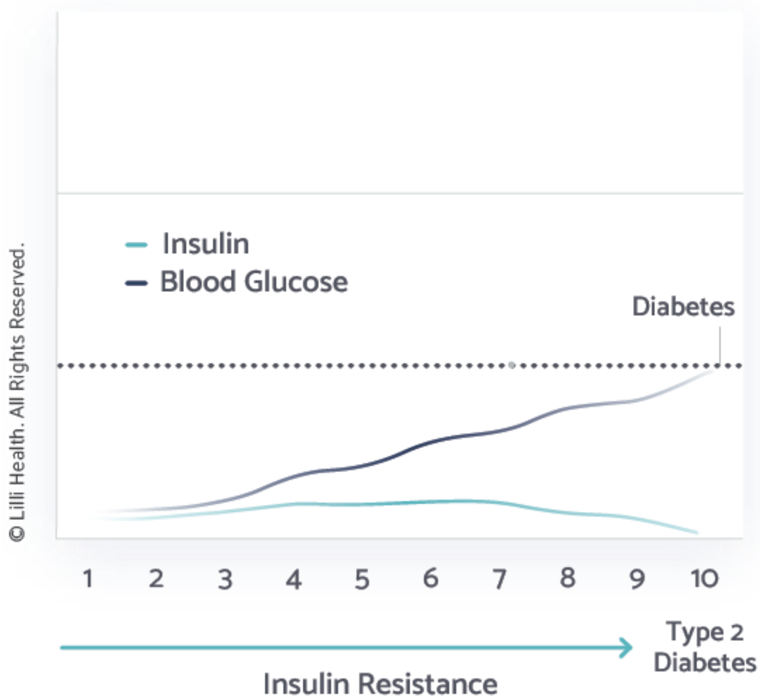


THE RETIRED PANCREAS

Some adults have what I like to call a retired pancreas. This results after years of high insulin levels and excessive demands on the pancreas. Eventually, the pancreas gives out (i.e., retires) and stops secreting enough insulin. Once this happens, blood sugars spike and the person is diagnosed with type 2 diabetes.

This graph shows that if someone has a low fasting insulin but high blood sugar, it probably indicates that their pancreas is nearing retirement.

THE LAZY PANCREAS



THE LAZY PANCREAS

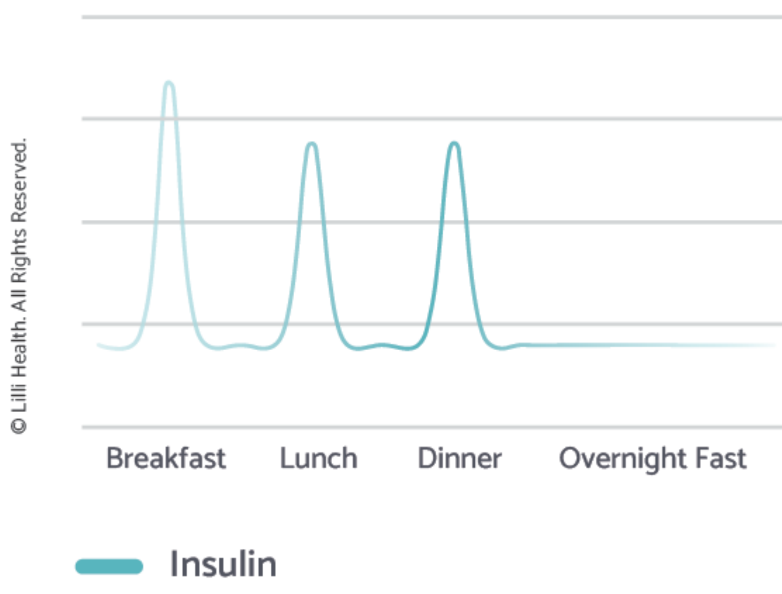
Some individuals have what I like to call a lazy pancreas. This is often found in persons of East or Southeast Asian descent and is why type 2 diabetes is common among these populations.

The lazy pancreas just can't keep up, especially when you consider that most Asian populations eat a diet heavy in starch. This results in these individuals having low insulin levels, despite rising blood sugars.

In this graph, you see that insulin levels are always low, but glucose levels continue to rise and rise as insulin levels decline over time.

Understanding Metabolic Flexibility

FLEXIBLE METABOLISM

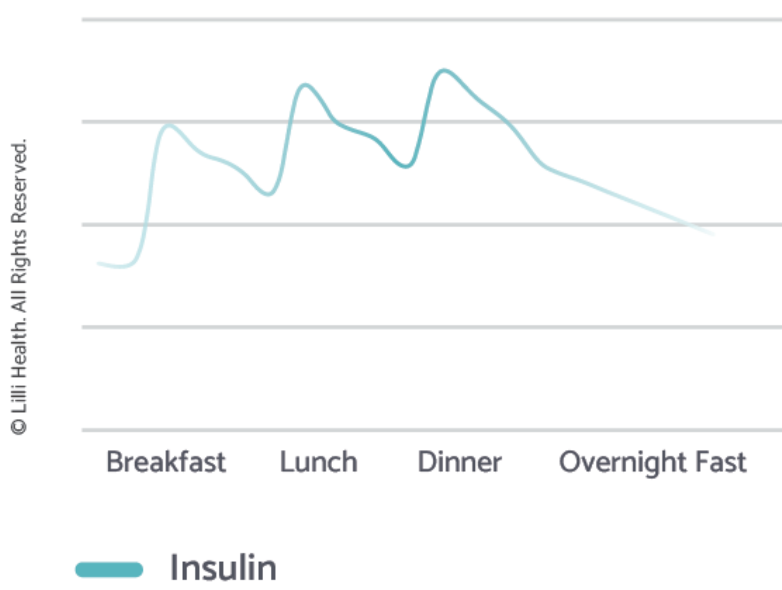


FLEXIBLE METABOLISM

This graph shows the rise and fall of insulin levels over the course of a day in a person who is metabolically flexible. After meals, insulin levels rise and then they come back down to baseline between meals and during an overnight fast.

When insulin levels rise, it allows the body to use glucose from food for energy, and when insulin levels are low, it allows stored body fat to be burned for energy.

INFLEXIBLE METABOLISM



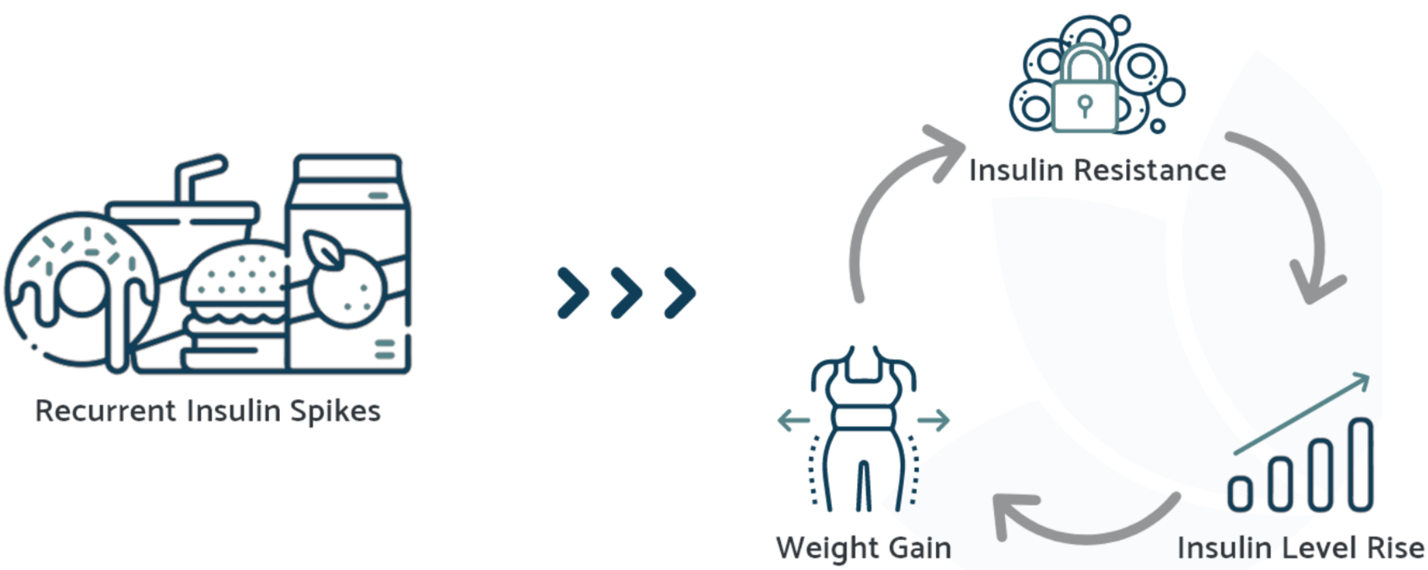
INFLEXIBLE METABOLISM

This graph shows a person who has an inflexible metabolism. They start their day with higher-than-normal fasting insulin levels and because insulin levels are so high, they aren't able to come back down to baseline between meals or during the over-night fast. This prevents the body from being able to burn stored body fat for energy.

Overall, hyperinsulinemia can inter-fere with the body's ability to switch between different fuel sources, leading to metabolic inflexibility.

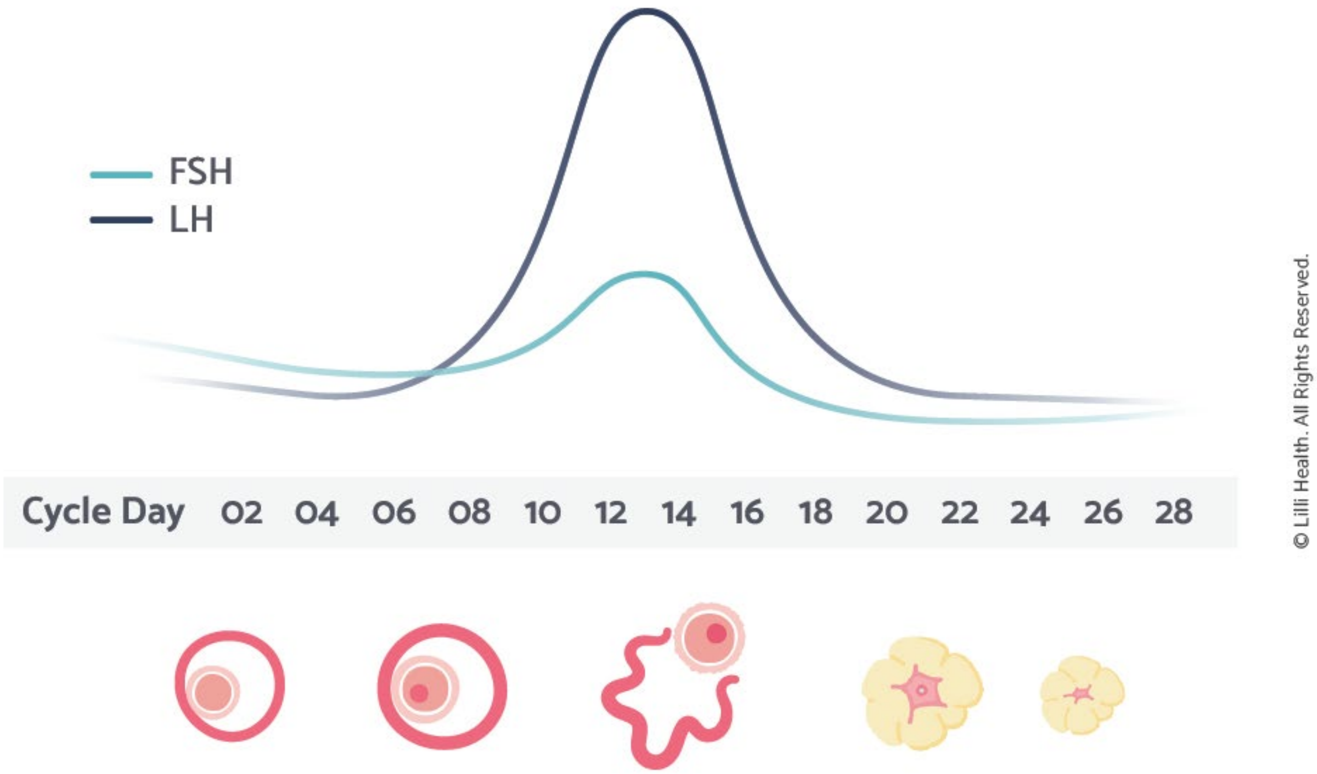
Hyperinsulinemia

THE VICIOUS CYCLE OF INSULIN RESISTANCE

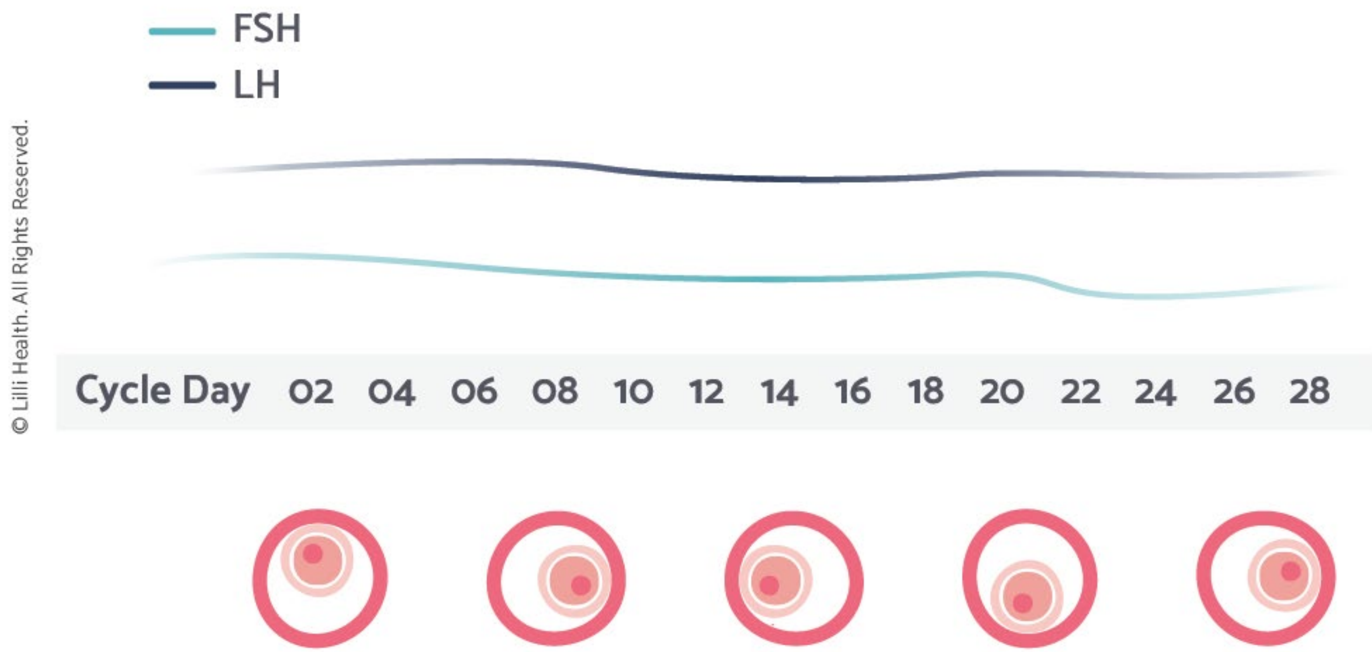


CHAPTER 3 - VARIATIONS IN GENETIC PREDISPOSITION TO HIGH INSULIN LEVELS

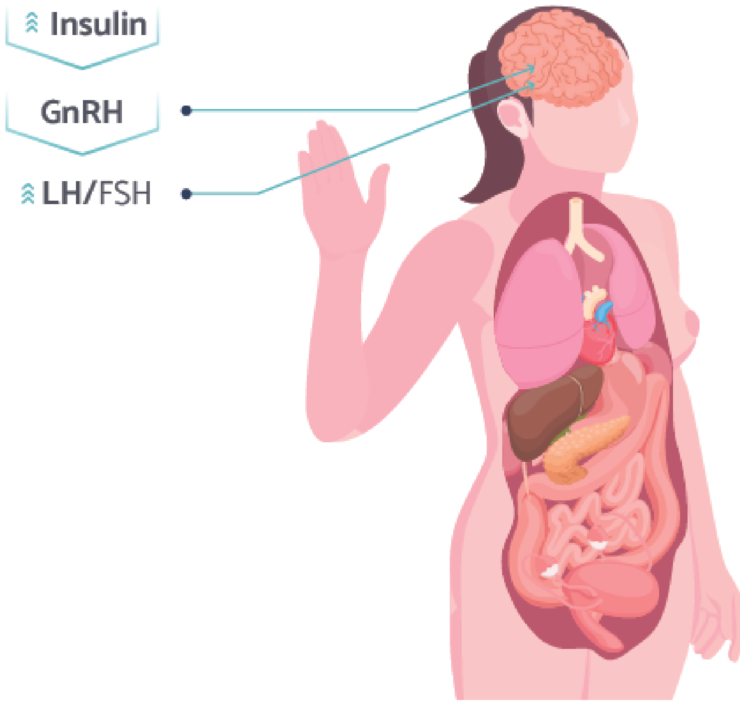
NORMAL MENSTRUAL CYCLE

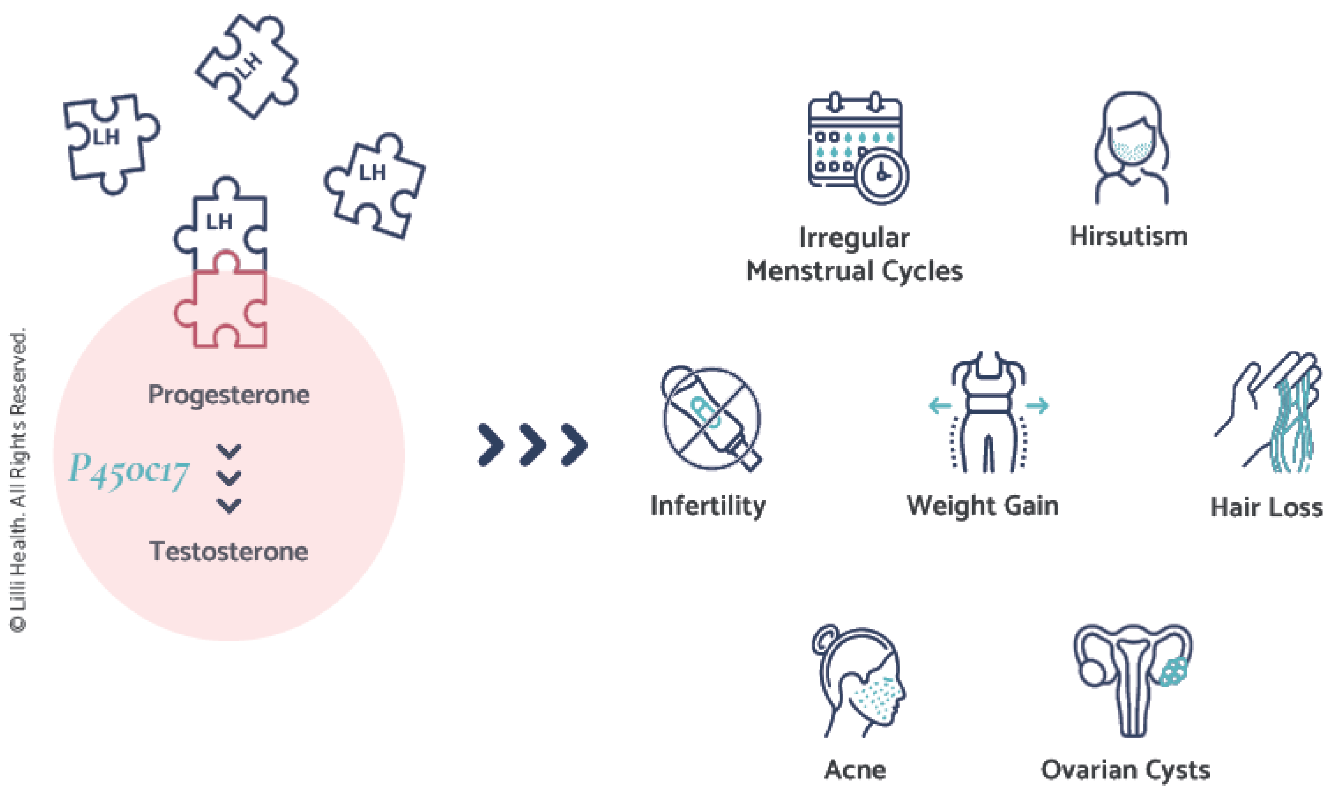


ANOVULATORY MENSTRUAL CYCLE



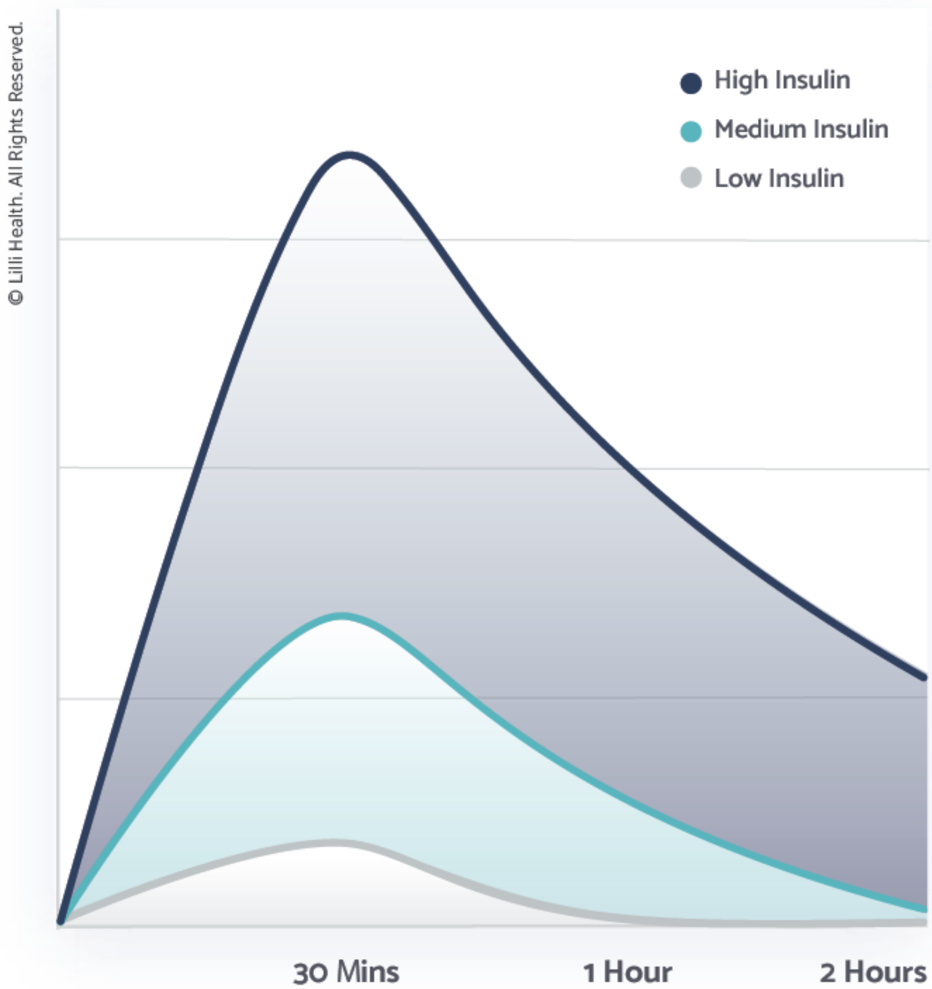
HOW HIGH INSULIN LEVELS LEAD TO SYMPTOMS OF PCOS





CHAPTER 5 – HOW TO LOWER INSULIN LEVELS

INSULIN SPIKING EFFECT OF DIFFERENT FOODS



This graph presents an estimation based on selected studies that show insulin responses to various types of foods. It doesn't represent the exact insulin curve for all individuals and it's simply meant to explain how different foods elicit a different insulin response.

High: starches, dairy, added sugar

Medium: protein, fruit

Low: vegetables, nuts, seeds, healthy oils

CHAPTER 7 – THE RESEARCH BEHIND A LOW INSULIN DIET

OVERVIEW OF THE RESULTS AFTER 8-WEEK LOW INSULIN LIFESTYLE

Lilli Health	Before 8-Week Diet	After 8-Week Diet	Results After Diet	% Change
Weight (lbs)	225.0	206.0	▼19.0	▼8.5
Waist Circumference (in)	43.2	39.9	▼3.3	▼7.6
Fasting Glucose (mg/dl)*	95.0	86.0	▼8.9	▼9.3
2-Hour Glucose (mg/dl)	128.0	114.9	▼13.1	▼10.2
Fasting Insulin (mIU/ml)	32.7	15.7	▼17.0	▼52.9
2-Hour Insulin (mIU/ml)	225.8	142.9	▼82.8	▼36.7
HOMA-IR**	3.9	1.9	▼1.9	▼48.7
HgbA1c (%)	5.5	5.2	▼0.3	▼5.4
Total Testosterone (ng/dl)	53.3	43.3	▼10.0	▼18.7
Free Testosterone (pg/dl)	7.8	6.0	▼1.8	▼23.1
Triglycerides (mg/dl)	162.8	108.2	▼57.0	▼35.0

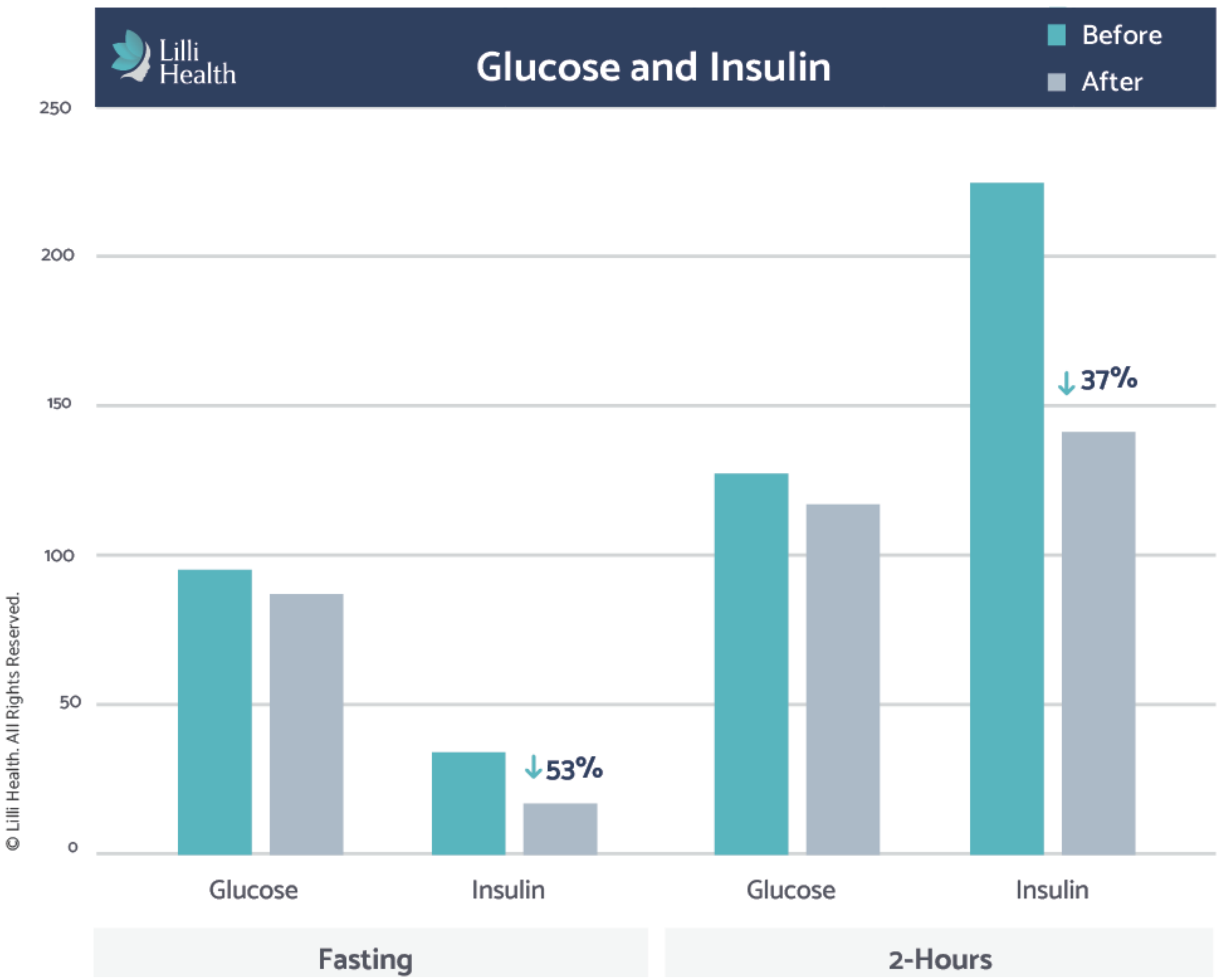
* Patients were not allowed to be in this study if they had confirmed diabetes, thus glucose levels were within the normal range both before and after the study.

** HOMA-IR: Homeostatic model assessment for insulin resistance is used to measure overall insulin resistance. A lower score shows an improvement in insulin resistance.

CHANGE IN GLUCOSE AND INSULIN BEFORE AND AFTER A LOW INSULIN LIFESTYLE

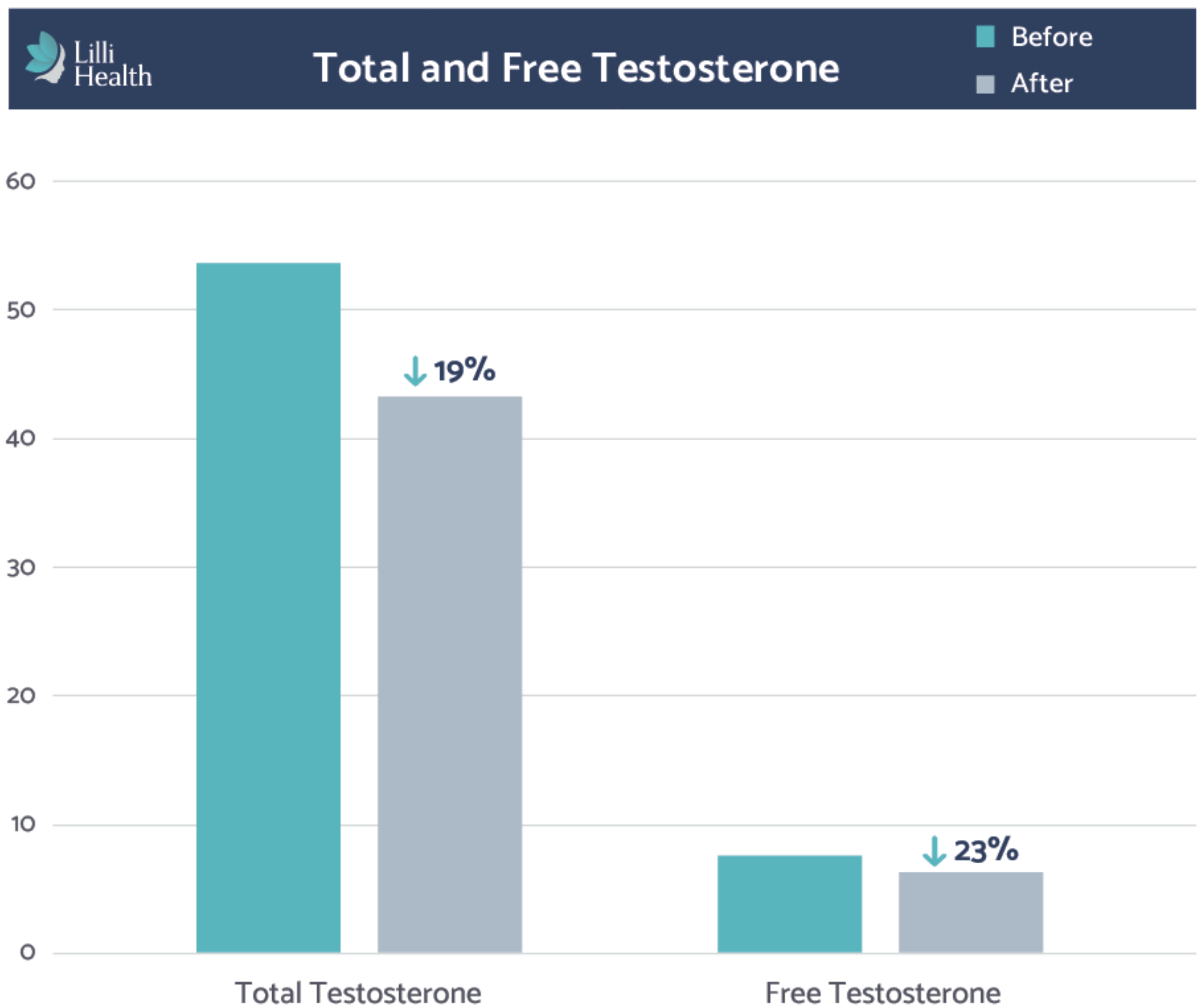
Lilli Health	Before	After	Change	% Change
Glucose (fasting) (mg/dl)	95.0	86.0	▼8.9	▼9.3
Glucose (2-hour) (mg/dl)	128.0	114.9	▼13.1	▼10.2
Insulin (fasting) (mIU/ml)	32.7	15.7	▼17.0	▼52.9
Insulin (2-hour) (mIU/ml)	225.8	142.9	▼82.8	▼36.7
HOMA-IR	3.9	1.9	▼1.9	▼48.7
HgbA1c (%)	5.5	5.2	▼0.3	▼5.5

Fasting glucose normal range: <100 mg/dl
2-hour glucose normal range: <140 mg/dl
Fasting insulin normal range: 3-8 mIU/ml
2-hour insulin normal range: 16-166 mIU/ml
HOMA-IR normal range: 1
HgbA1c normal range: <5.7%



CHANGE IN TOTAL AND FREE TESTOSTERONE BEFORE AND AFTER A LOW INSULIN LIFESTYLE

Lilli Health	Before	After	Change	% Change
Testosterone (total) (ng/dl)	53.3	43.3	▼10.0	▼18.7
Testosterone (free) (pg/dl)	7.8	6.0	▼1.8	▼23.1



Total testosterone normal range for PCOS: <20 ng/dl
Free testosterone normal range for PCOS: .06-2.57 pg/dl

CHANGE IN CHOLESTEROL AND LIPIDS FOLLOWING A LOW INSULIN LIFESTYLE

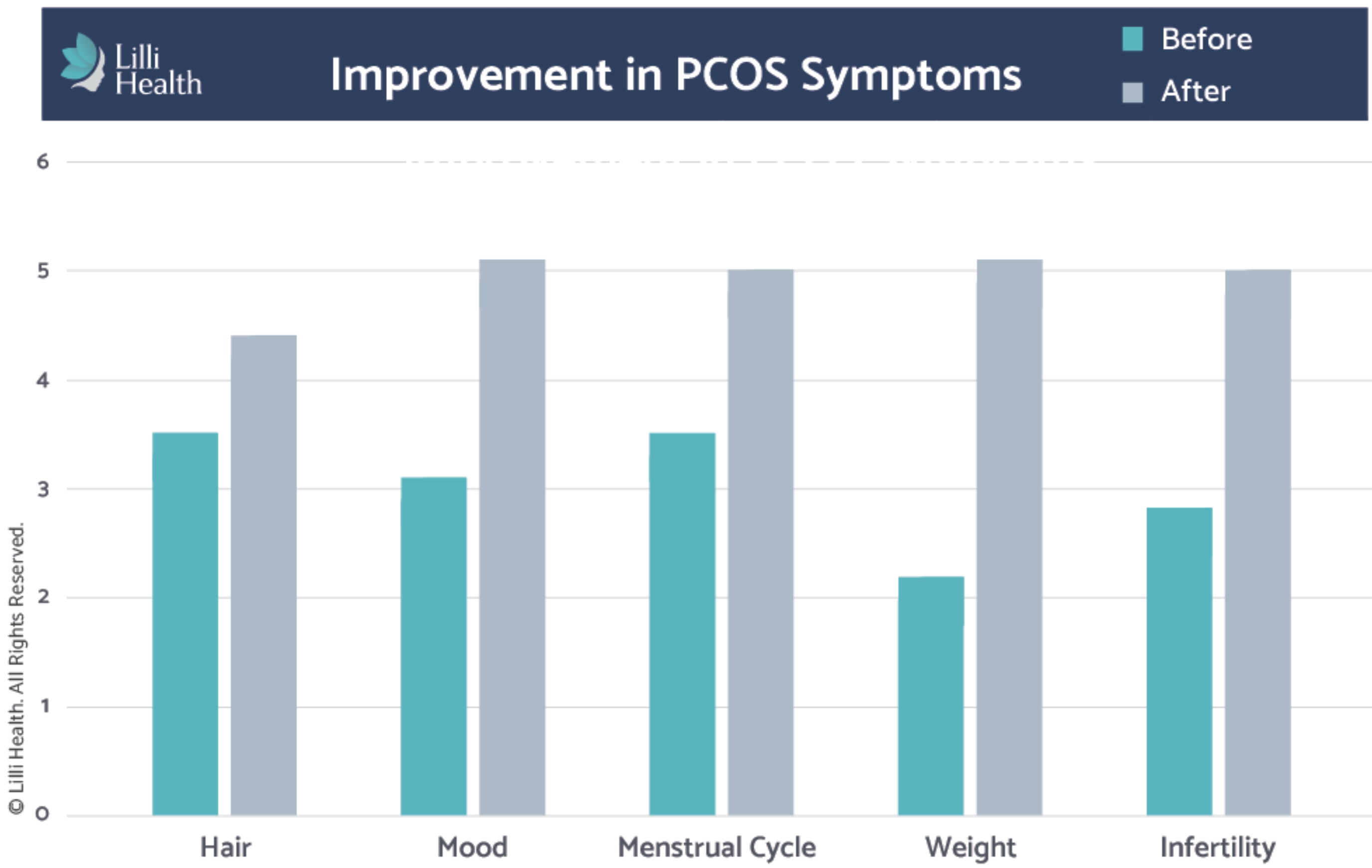
Lilli Health	Before	After	Change	% Change
Triglycerides (mg/dl)	162.8	108.2	▼57.0	▼35.0
Total Cholesterol (mg/dl)	195.9	186.7	▼9.3	-
LDL Cholesterol (mg/dl)	127.7	124.7	▼2.3	-
HDL Cholesterol (mg/dl)	47.6	41.9	▼5.7	-
Vitamin D (ng/mL)	20.3	24.7	▲4.4	-

Triglycerides normal range: <150 mg/dl
Total cholesterol normal range: <200 mg/dl
LDL cholesterol normal range: <100 mg/dl

HDL cholesterol normal range: >40 mg/dl
Vitamin D normal range: 20-40 ng/ml

IMPROVEMENTS IN PCOS SYMPTOMS BEFORE AND AFTER A LOW INSULIN LIFESTYLE

Lilli Health	Before	After	Change
Hair	3.5	4.4	▲0.9
Mood	3.1	5.1	▲2.0
Menstrual Cycle	3.5	5.0	▲1.5
Weight	2.2	5.1	▲2.9
Infertility	2.8	5.0	▲2.2

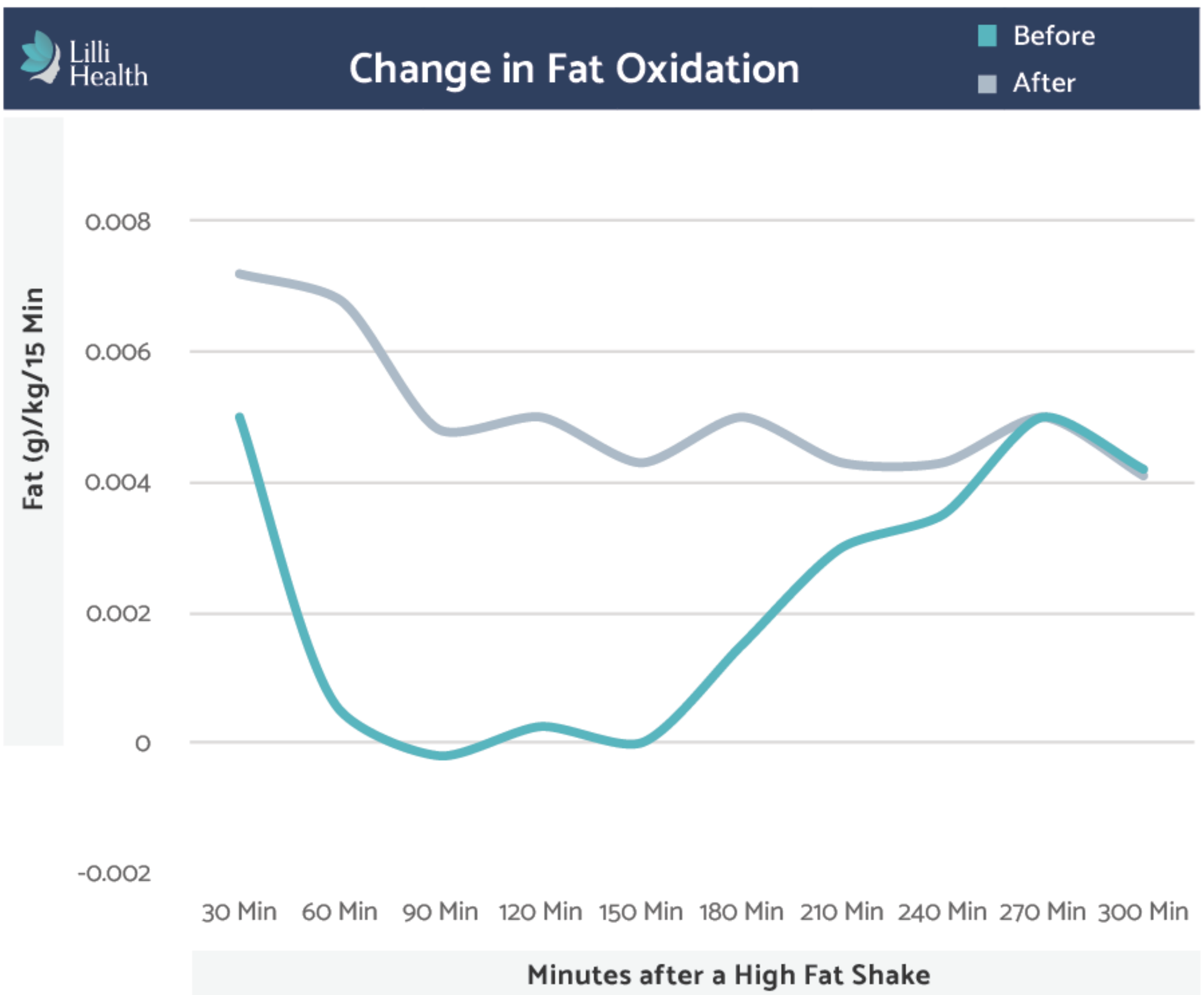


IMPROVEMENTS IN BINGE EATING BEHAVIORS AFTER A LOW INSULIN LIFESTYLE

Improvements in Binge Eating Behaviors After a Low Insulin Lifestyle

Lilli Health	Before	After	Change
Binge Eating Severity	18.0	7.0	▼ 11.0

CHANGE IN FAT OXIDATION



Replicating the Results

CHANGE IN FASTING INSULIN BETWEEN THE THREE GROUPS AFTER 8 WEEKS

Lilli Health	Fasting Insulin (µIU/ml)		
	Pre-Diet	Post-Diet	% Change
Control	21.9	23.2	▲5.9
Video Education	20.2	17.6	▼12.8
Face-to-Face	32.2	20.6	▼36.0

WEIGHT LOSS BETWEEN THE THREE GROUPS AFTER 8 WEEKS

Lilli Health	Weight Loss (lbs)	BMI (kg/m²)	Waist Circumference (in)	Hip Circumference (in)
Control	▲0.4	▲0.3	▼0.4	▼0.5
Video Education	▼12.9	▼2.2	▼1.8	▼1.7
Face-to-Face	▼17.3	▼3.1	▼3.2	▼3.3

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