

**ACTIVATE YOUR**  
**LEAN**  
**GENES**

**Everything you need to know about Epigenetics,  
Diabetes, Health and Muscle-building**

**[WWW.DIABETICMUSCLEANDFITNESS.COM](http://WWW.DIABETICMUSCLEANDFITNESS.COM)**

# WELCOME

**I am excited that you have invested the time to develop your diabetes skills. By the end of this course you will:**

- 1. Understand the benefit of turning on your LEAN GENES**
- 2. Have a deep understanding of how to modify the Master Regulators that turn on your LEAN GENES**
- 3. Understand the process of Hormesis**
- 4. Develop the skills to take advantage of Hormesis with:**
  - Polyphenols
  - Cold Stress
  - Fasting
- 5. Most importantly, YOU WILL ACQUIRE A NEW SET OF TOOLS TO IMPORVE DIABETES MANAGEMENT.**

# How will you do all this?

Understand the benefit of turning on your LEAN GENES.



YOU MUST CONVERT YOUR UNDERSTANDING INTO LEARNING BY TAKING ACTION.

I have purposely not included a load of written text content into this workbook. That is because learning is a participation sport, it is YOUR job to:

1. Annotate the key diagrams with how you understand it.
2. Use the tables to write the key points and then most importantly how YOU are going to take action.
3. Document your results and share them with the rest of the Diabetic Muscle and Fitness community in the Facebook Group.
4. Share your knowledge with other people living with diabetes and your healthcare professionals.

# How to get the most out this course?

1. Print this workbook and complete the tasks that are discussed in the video.
2. Complete the action plans at the end of each module.
3. Implement your plans before moving to the next module.
4. Document your progress on the **Facebook Group** and hit me up with questions and areas where it can be improved.

If you just watch all the videos back to back and do not follow the above points, it's a certainty you are a spectator, and it's only the participants who learn through action.  
ENJOY!

# **COURSE** CONTENT

## **Module 1**

- What are LEAN GENES?

## **Module 2**

- Turning on the MASTER REGULATORS

## **Module 3**

- Self-Assessing Polyphenol Intake

## **Module 4**

- Cold Stress

## **Module 5**

- Turning on the MASTER REGULATORS

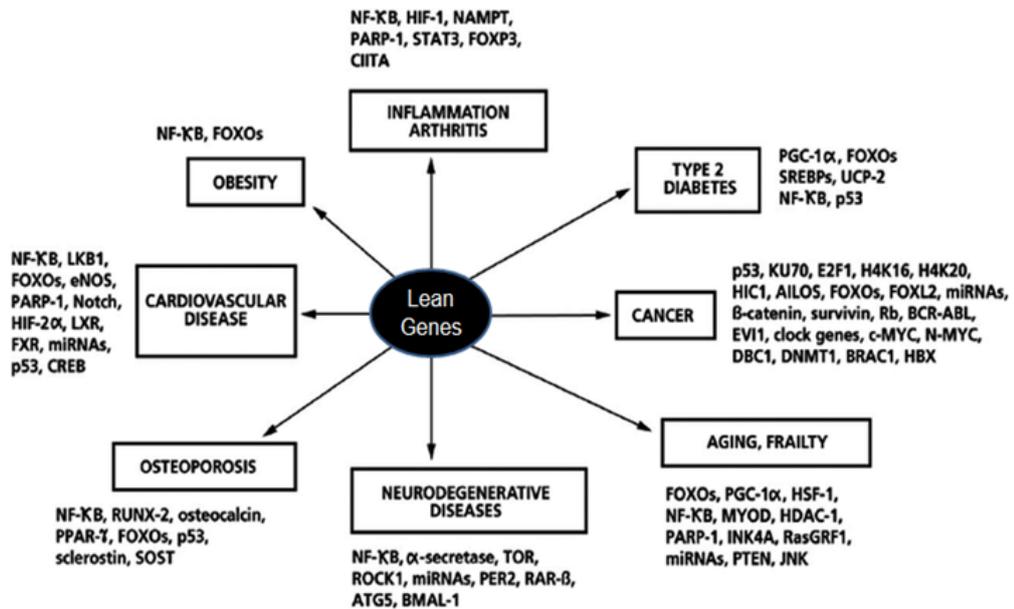
## **Module 6**

- The Test

## **Key Resources**

# Module 1

## What are LEAN GENES?



### Diabetes Specific LEAN GENES

#### Liver

Increased gluconeogenesis Decreased glycolysis	Increased lipolysis
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#### Pancreas

Increased insulin secretion	$\beta$ islet cell protection
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#### Adipose tissue

Increased lipolysis Decreased adipogenesis	Increased Adipose triglyceride lipase
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# Sirtuin Enzymes: The Master Regulators

Master Regulators  
Sirtuin Enzymes

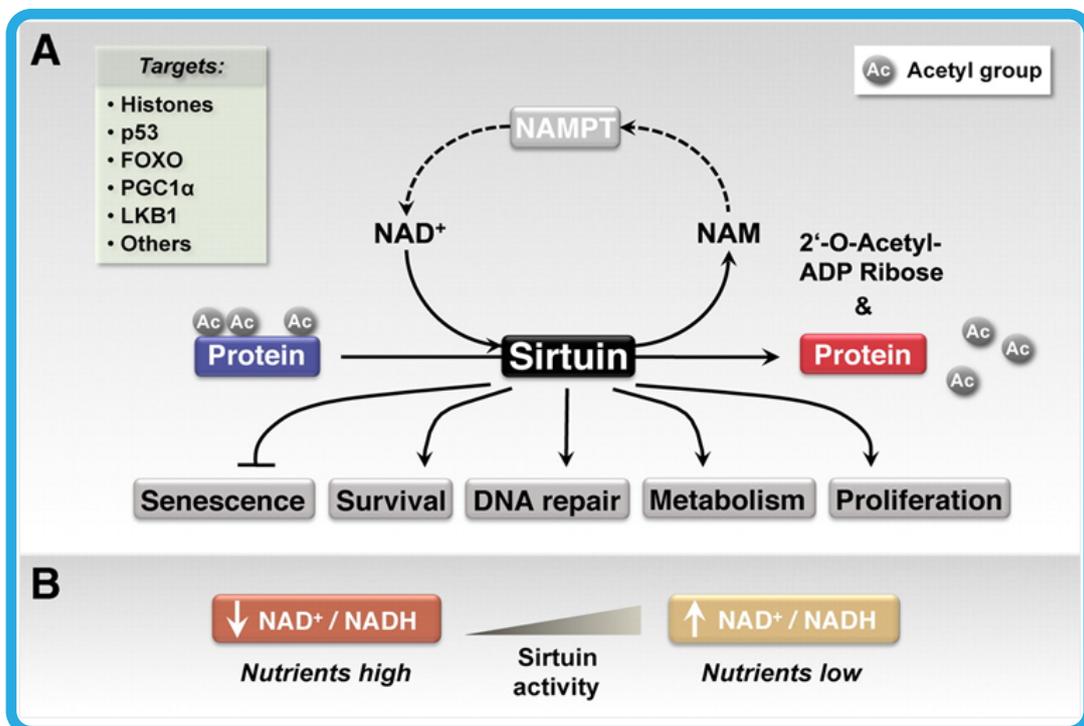


Epigenetics

LEAN GENES



How to **Turn On** the  
Master Regulators



# Hormesis

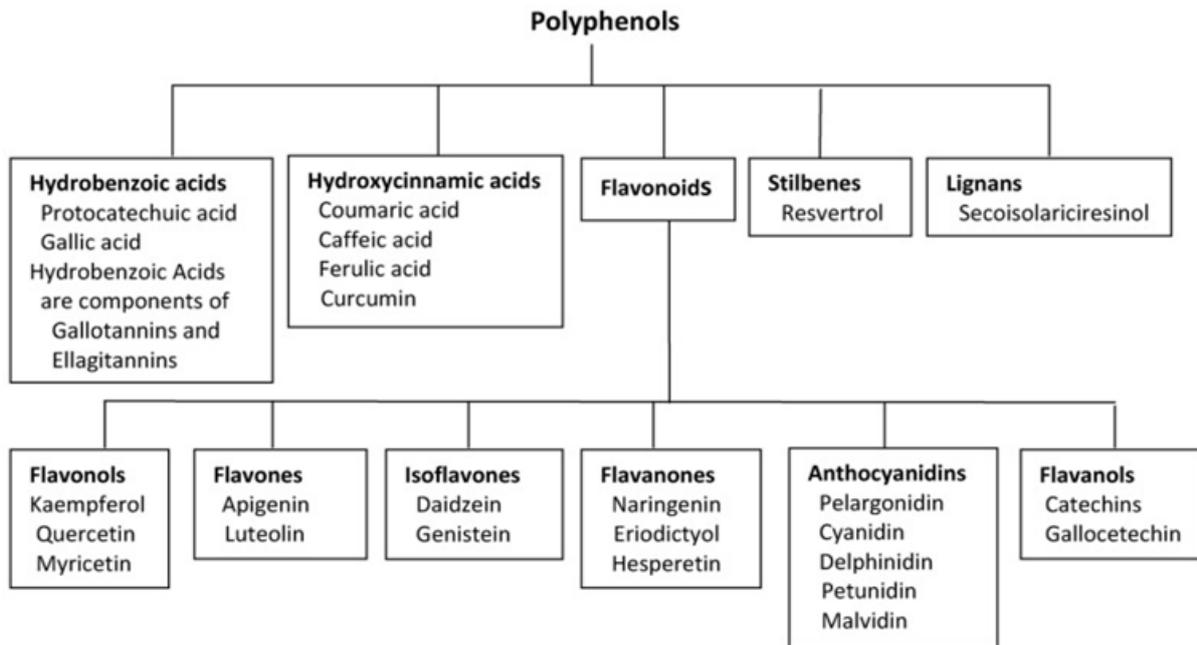
What does not kill you makes you stronger!

- Superfoods - High in Polyphenols (Xenohormesis)
- Exposure to Cold Stress - Cold showers
- Fasting / Calorie Restriction
- Exercise
- Exposure to Heat Stress - Sauna

My key understanding and knowledge points	How to apply: Be SMART & Accountable
1.	
2.	
3.	

# Module 2

## Turning on the MASTER REGULATORS



### NATIONAL AVERAGE DAILY POLYPHENOL INTAKE (MG)

POPULATION	AVERAGE
DENMARK	1800MG
UK	1600MG
JAPAN	1500MG
FRANCE	1400MG
ITALY	1300MG
GERMANY	1200MG
NETHERLANDS	1200MG
NORWAY	1100MG
SWEDEN	1000MG
GREECE	650MG

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# The Polyphenol and Microbiome Synergy

"In summary, recent literature demonstrates that the mutual relationship between gut microbiota and phenolic compounds increases the bioavailability of phenolics and provides increased health benefits.

Phenolic compounds can alter the gut microbiota community, resulting in a greater abundance of beneficial microbes, and a consequent increase in bioavailability.

At the same time, phenolic compounds are bio-transformed into their smaller metabolites by gut microbiota, which also contributes to increased bioavailability."

Nutrients2016, 8, 78; doi:10.3390/nu8020078

## Cultivating a Healthy Microbiome

- Taste the rainbow of fruit and vegetables.
- Eat fermented food to seed The gut with good bacteria - kimchi & sauerkraut.
- Fermented dairy such as natural yoghurt.
- Pre-biotic fibre from vegetables - Onions, leeks, garlic.
- Keep alcohol to two nights a week, at 2-4 units.
- If use anti-biotics consider a pro-biotic supplement to replace the destroyed bacteria.

<b>My key understanding and knowledge points</b>	<b>How to apply: Be SMART &amp; Accountable</b>
<b>1.</b>	
<b>2.</b>	
<b>3.</b>	

# Module 3

## Self-Assessing Polyphenol Intake

### YOUR BEFORE LEAN GENE REPORT

FOOD GROUP	POLYPHENOL INTAKE PER DAY IN MILLIGRAMS (MG)	IS YOUR INTAKE LOW, MEDIUM, OPTIMAL OR HIGH?	CONSIDERATION
TOTAL POLYPHENOL INTAKE			
BEANS, LENTILS AND GRAINS			
COFFEE PRODUCTS			
TEAS & COCOA PRODUCTS			
FRUITS & FRUIT JUICES			
HERBS, SPICES & CONDIMENTS			
NUTS & SEEDS			
VEGETABLES			
WINE & GRAPES			
CAFFEINE INTAKE			

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# 4-Week Polyphenol Challenge

- Complete the Calculator and complete the table above.
- Set goals to increase intake in low/medium areas.
- Use the Top Foods lists below to prioritise foods options.
- Use the next few slide to increase the bioavailability of Polyphenols.
- Complete the Polyphenol calculator in 4 weeks, complete the table below, check to see if you have met your goals.

## Once Completed

- Feedback pictures of you improved intake and experience in the Facebook group.
- How did impact your diabetes control?
- How did it improve your health?
- How did you feel?

### ACTIVATE YOUR LEAN GENES WITH BEANS, LENTILS AND GRAINS THAT HAVE OVER 20MG POLYPHENOLS

BEANS, LENTILS AND GRAINS (USUAL SERVING)	POLYPHENOL MG PER SERVING	KCAL PER SERVING	PROTEIN (G) PER SERVING	CARBS (G) PER SERVING	FAT (G) PER SERVING
Beans, black (half cup cooked)	1668	162	11	25	2
Lentils (half cup cooked)	739	136	10	24	0
Beans, White (half cup cooked)	164	158	10	25	2
Buckwheat, wholegrain flour (1 slice of bread or 2 Tblspn)	148	69	2	13	1
Wheat whole Grain flour (1 slice bread or 2 Tblspn)	34	52	1	12	0
Maize flour (1 slice of bread or 2 Tblspn)	24	52	1	12	1

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**ACTIVATE YOUR LEAN GENES WITH TEAS AND COCOA PRODUCTS THAT HAVE OVER 100MG POLYPHENOLS**

<b>FOOD (USUAL SERVING)</b>	<b>POLYPHENOL MG PER SERVING</b>	<b>KCAL PER SERVING</b>	<b>PROTEIN (G) PER SERVING</b>	<b>CARBS (G) PER SERVING</b>	<b>FAT (G) PER SERVING</b>
Chocolate, Dark 85% Cocoa (small bar)	333	114	2	4	10
Tea, Green Matcha (1 heaped tsp = 3g)	300	0.8	0	0.2	0
Cocoa powder (1 Tblspn)	281	30	1	2	2
Tea, Black decaffeinated (1 bag = 3g)	199	0.8	0	0.2	0
Tea, Black caffeinated (1 bag = 3g)	199	0.8	0	0.2	0
Tea, Green decaffeinated (1 bag = 2g)	174	0.8	0	0.2	0
Tea, Green caffeinated (1 bag = 2g)	174	0.8	0	0.2	0
Tea, Green Matcha (1 bag = 1.5g)	150	0.8	0	0.2	0
Apple juice, pure (1 medium glass = 150ml)	102	68	0	17	0

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**ACTIVATE YOUR LEAN GENES WITH FRUITS THAT HAVE OVER 150MG POLYPHENOLS**

FOOD (USUAL SERVING)	POLYPHENOL MG PER SERVING	KCAL PER SERVING	PROTEIN (G) PER SERVING	CARBS (G) PER SERVING	FAT (G) PER SERVING
Chokeberry, Black (1 handful = 50g))	878	24	2	5	0
Elderberry, Black (1 handful = 50g))	680	24	0	5	0
Fig, Dried (3 dried)	576	132	1	30	0
Prunes (one medium)	382	52	0	12	0
Blackcurrant (1 handful = 50g))	379	24	0	5	0
Plum (two medium)	368	40	0	10	0
Ligonberry (1 handful = 50g)	333	24	0	5	0
Gooseberry (1 handful = 50g)	322	24	0	5	0
Dates, Medjool (3 dates)	300	180	3	42	0
Blueberries (1 handful = 50g)	280	24	1	5	0
Peach, (one medium)	251	44	1	10	0
Dates, Ajaw (3 dates)	245	180	3	42	0
Strawberry Fruits (1 handful = 90g)	212	16	0	4	0
Banana (one medium)	185	116	1	28	0
Avocado (half of medium size)	180	123	0	6	11
Pineapple (1/4 pineapple)	176	68	1	16	0
Raisins (1 Tblspn)	160	48	0	12	0
Orange (one medium)	160	88	1	21	0
Apple (one medium)	150	68	0	17	0

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**ACTIVATE YOUR LEAN GENES WITH VEGETABLES THAT HAVE OVER 20MG POLYPHENOLS**

FOOD (USUAL SERVING)	POLYPHENOL MG PER SERVING	KCAL PER SERVING	PROTEIN (G) PER SERVING	CARBS (G) PER SERVING	FAT (G) PER SERVING
Artichoke, Globe heads (1 medium)	1713	32	5	3	0
Chard, Red Swiss (palm size portion = 50g)	660	16	2	2	0
Olives, Black (5 olives)	313	65	0	5	5
Olives, Green (5 olives)	190	65	0	5	5
Chicory, Red (one head = 50g)	118	16	2	2	0
Onion, Red (half onion = 60g)	101	24	1	5	0
Capers (1 Tblspn)	98	17	1	1	1
Chicory, Green (one head = 50g)	83	16	2	2	0
Shallot (1 cup = 70g)	79	12	1	2	0
Spinach (1cup = 60g)	70	16.5	2	1	0
Onion, yellow (half of onion = 60g)	44	28	2	5	0
Broccoli (1 cup = 70g)	32	28	2	5	0
Kale (1 cup = 70g)	22	36	2	7	0
Asparagus (5 spears)	22	25	3	1	1

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## ACTIVATE YOUR LEAN GENES WITH HERBS AND SPICES THAT HAVE OVER 20MG POLYPHENOLS

FOOD (USUAL SERVING)	POLYPHENOL MG PER SERVING
Chilli, Birds eye (one chilli to 1 tsp)	360
Cloves Spice (1 tsp)	320
Star anise (1tsp)	320
Cinnamon (1 tsp)	194
Celery, Seeds (1 tsp)	110
Caraway (1 tsp)	58
Oregano Spice (1 tsp)	46
Cumin (1 tsp)	41
Turmeric, Dried (1 tsp)	40
Sage (1 tsp)	24
Curry, powder (1 tsp)	22
Rosemary (1 tsp)	20
Pepper, black (1 tsp)	20

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**ACTIVATE YOUR LEAN GENES WITH TEAS AND COCOA PRODUCTS  
THAT HAVE OVER 100MG POLYPHENOLS**

<b>FOOD (USUAL SERVING)</b>	<b>POLYPHENOL MG PER SERVING</b>	<b>KCAL PER SERVING</b>	<b>PROTEIN (G) PER SERVING</b>	<b>CARBS (G) PER SERVING</b>	<b>FAT (G) PER SERVING</b>
Chestnut (palm size = 30g)	688	64	1	15	0
Walnut (palm size = 30g)	472	216	5	4	20
Pistachio nuts (palm size = 30g)	426	181	2	5	17
Flaxseed meal (2 Tblspn)	199	82	3	4	6
Pecan nut Seeds (palm size = 30g)	148	209	3	2	21
Hazelnut (palm size = 30g)	139	185	4	4	17
Cashew Nuts, Raw (palm size = 30g)	70	182	6	8	14
Almonds (palm size = 30g)	56	197	6	5	17

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**ACTIVATE YOUR LEAN GENES WITH TEAS AND COCOA PRODUCTS  
THAT HAVE OVER 100MG POLYPHENOLS**

<b>FOOD (USUAL SERVING)</b>	<b>CAFFEINE MG PER SERVING</b>	<b>POLYPHENOL MG PER SERVING</b>
Peppermint Tea (1 bag)	1	60
Coffee, decaffeinated (1 heaped tsp)	5	214
Tea, Black decaffeinated (1 bag = 3g)	5	199
Tea, Green decaffeinated (1 bag = 2g)	5	174
Cocoa powder (1 Tblspn)	11	281
Chocolate, Milk Cocoa powder (2 Tblspn)	5	76
Tea, Green caffeinated (1 bag = 2g)	25	174
Tea, Green Matcha (1 heaped tsp = 3g)	50	300
Tea, Green Matcha (1 bag = 1.5g)	25	150
Tea, Black caffeinated (1 bag = 3g)	60	199
Coffee, caffeinated (1 heaped tsp)	100	214

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**YOUR AFTER LEAN GENE REPORT**

FOOD GROUP	POLYPHENOL INTAKE PER DAY IN MILLIGRAMS (MG)	IS YOUR INTAKE LOW, MEDIUM, OPTIMAL OR HIGH?	CONSIDERATION
Total Polyphenol Intake			
Beans, Lentils and Grains			
Coffee products			
Teas & Cocoa Products			
Fruits & Fruit Juices			
Herbs, Spices & Condiments			
Nuts & Seeds			
Vegetables			
Wine & Grapes			
Caffeine intake			

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How can you increase Polyphenol Absorption?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

<b>My key understanding and knowledge points</b>	<b>How to apply: Be SMART &amp; Accountable</b>
1.	
2.	
3.	

# Module 4

## Cold Stress

### Cold Stress Options

#### 1. Cold shower:

- a. Turn the shower to full cold and stand under for 5-15 minutes.
- b. Temperature 5-10 degrees Celsius (40-50 degrees Fahrenheit)

#### 2. Cold bath or bin:

- a. Submerge up to the neck for 5-15mins.
- b. Temperature 5-10 degrees Celsius (40-50 degrees Fahrenheit)

#### 3. Cryotherapy:

- a. Enter a cold capsule and be blasted by liquid nitrogen for a short time period, usually 2-3 minutes.

#### How does Cold Stress increase Sirtuin Activation?

A.

#### When you should not use Cold Stress?

A.

# Safety Advice When using Cold Stress

- Make sure glucose is above 5mmol/l (90mg/dl) before starting.
- Measure glucose before and after and 30 minutes after to see the effect.
- Start with 1 minute and build up one minute each session
  - Ideal 5-15mins water and 2-3mins Cryotherapy.
- Have someone with you for the first few times.
- Make sure your last bolus insulin was at least three hours ago.
- Keep to 3-5 times a week for practicality, and to reduce to risk of too much stress.
- If you are dieting hard and in a big energy deficit, do not use cold stress.
- Never use Cold Stress if you have a Heart Condition

## 4-Week Cold Water Challenge

### Week 1

**minimum 5 days a week**

---

Monday - Wednesday = *1 min*

Thursday - Sunday = *1 min 30sec*

### Week 2

**minimum 5 days a week**

---

Monday - Wednesday = *2 mins*

Thursday - Sunday = *2 min 30sec*

### Week 3

**minimum 5 days a week**

---

Monday - Wednesday = *3 mins*

Thursday - Sunday = *4 mins*

### Week 4

**minimum 5 days a week**

---

Monday - Sunday = *5 mins*

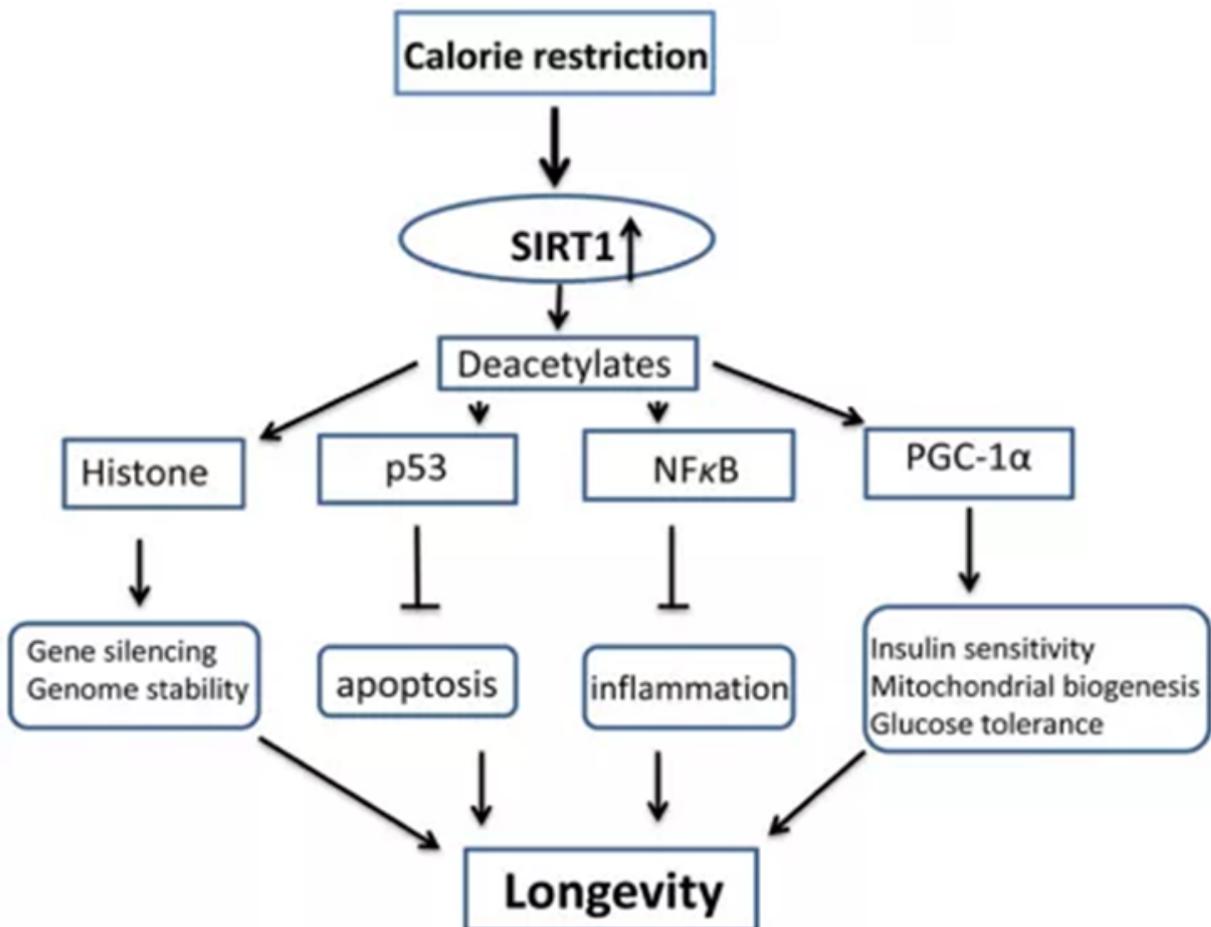
**Once completed:**

- Update the Facebook Group on:
  - Diabetic Muscle and Fitness Facebook Group
  - Tag John Stuart Pemberton
- How it made you feel
- How it impacted your glucose control
- How it altered your mood
- How it built a level of persistence

My key understanding and knowledge points	How to apply: Be SMART & Accountable
1.	
2.	
3.	

# Module 5

## Fasting and Caloric Restriction



**What method of Fasting best suits people with diabetes and why?**

1. \_\_\_\_\_

**When should you avoid fasting?**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

# 4-Week Intermittent Challenge

## Week 1

- **14 hour fasting window:**

---

- 18:00 – 08:00 – or choose suitable window
- Unlikely to need adjustments

## Week 2

- **16 hour fasting window:**

---

- 18:00 – 10:00 – or choose suitable window
- May need a correction dose in the morning

## Week 3

- **18 hour fasting window:**

---

- 18:00 – 12:00 – or choose suitable window
- May need a correction dose in the morning
- May need a 10-20% reduction in morning background insulin

## Week 4

- **20 hour fasting window:**

---

- 18:00 – 14:00 – or choose suitable window
- May need a correction dose in the morning
- May need a 10-20% reduction in morning background insulin
  - If split Levimer or NPH, reduce morning dose by 20-30%
  - If pump, reduce basal by 20-30% until waking to 13:00

**Once completed:**

- Update the Facebook Group on:
  - Diabetic Muscle and Fitness Facebook Group
  - Tag John Stuart Pemberton
- How it made you feel
- How it impacted your glucose control
- How it altered your mood
- How it built a level of persistence

My key understanding and knowledge points	How to apply: Be SMART & Accountable
1.	
2.	
3.	

# Module 6

## The Test

Complete the Test and watch the video module for the answers.

**1. What are the name of the Master Regulator enzymes?**

A. \_\_\_\_\_

**2. How many Master Regulators are there?**

A. \_\_\_\_\_

**3. What is the bullet in the Gun of the Master Regulators?**

A. \_\_\_\_\_

**4. What major benefit does turning on the Master Regulators have for people with diabetes?**

A. \_\_\_\_\_

**5. What's the name of the process that turn on the Master Regulators?**

A. \_\_\_\_\_

**6. What 5 key things turn on the Master Regulators?**

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

D. \_\_\_\_\_

E. \_\_\_\_\_

**7. What 5 types of Polyphenols?**

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_
- E. \_\_\_\_\_

**8. What two diseases has a high intake of Polyphenols be shows to reduce the risk of?**

- A. \_\_\_\_\_
- B. \_\_\_\_\_

**9. What works in synergy with Polyphenols?**

- A. \_\_\_\_\_

**10. What can you add to tea to increase Polyphenol intake?**

- A. \_\_\_\_\_

**11. How does cold stress induce Hormesis?**

- A. \_\_\_\_\_

**12. How many minutes of cold water exposure do you need to get the benefit?**

- A. \_\_\_\_\_

**13. What health condition should prevent people for using cold Stress?**

- A. \_\_\_\_\_

**14. Why is Intermittent Fasting easier for people with diabetes to employ?**

- A. \_\_\_\_\_

**15. What three training phases might fasting cause a negative effect?**

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_

**16. What two insulin regimen changes may you need if you start intermittent fasting?**

- A. \_\_\_\_\_
- B. \_\_\_\_\_

**Total score:    /28**

Post your score on the Facebook page and Tag in John Stuart Pemberton

Key Resources

- 1. The Diabetes and Muscle Fitness Guide.**
- 2. The Diabetic Muscle and Fitness Facebook Group.**
- 3. The Diabetic Muscle and Fitness Online Coaching Academy.**