

# Intermittent Fasting: Positive Effects On Cardio Metabolic Risk Factors

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## Purpose and Methods

The purpose of this narrative literature review was to identify if intermittent fasting can positively affect cardio metabolic risk factors:

- Blood Pressure
- Obesity
- Cholesterol/Triglyceride Levels
- Blood Glucose

This narrative literature review used peer-reviewed literature no less than 10-years old unless significantly relevant data produced.

Databases such as PubMed, Google Scholar and Eagle Online Library Database of Tennessee Technological University were used to locate literature.

## What is Intermittent Fasting (IF)/Time Restricted Eating (TRE)

- A predetermined time of going without a significant amount calories or no kcal consumption<sup>1</sup>
- The idea of fasting is that our bodies will switch from burning glucose to fat during fasting periods as glucose storage is depleted.<sup>1</sup>
- IF and TRE have shown to lead to weight loss, but is this because of the “metabolic switch” of burning fat or because its inherently reduction in calorie restriction due to restricted eating window?<sup>1</sup>
- Do the biological mechanisms of IF/TRE have positive effects on cardio metabolic risk factors such as obesity, cholesterol/triglyceride levels, blood glucose and blood pressure?

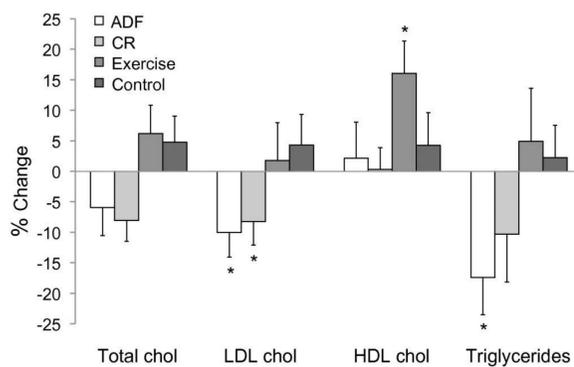
## IF/TRE Examples

- 18/6 Fasting for 18 hours a day and eating all calories within 6-hour window.<sup>1</sup>
- 16/8 Fasting for 16 hours of a day and eating calories within an 8-hour window.<sup>1</sup>
- 5:2 fasting for 2 days of the week and eating normally 5 days.<sup>1</sup>
- Alternate Day Fasting (ADF) fasting one day and eating normally the next day.<sup>1</sup>
- Multiple other forms of IF and TRE exist.

## Results:

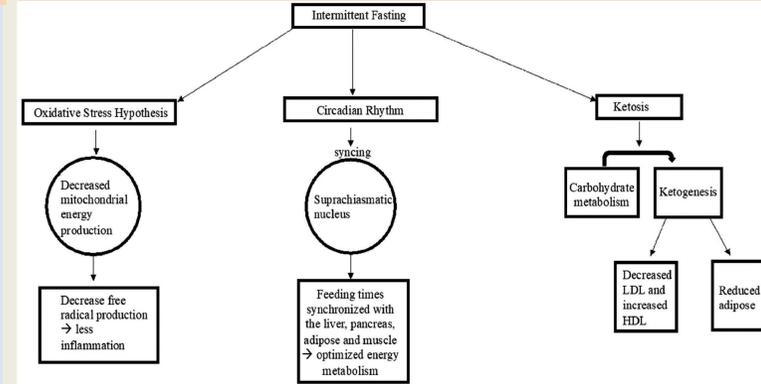
### Cardio Metabolic Effects of IF/TRE (Weight & Blood Lipid Levels)

- Ramadan Fasting Decreases Weight ( $-1.34$  (95% CI:  $-1.61$  to  $-1.07$ ) kg,  $p < 0.001$ ).<sup>2</sup>
- 10hr TRE schedule for 12 weeks showed body weight reduction by  $-3.30 \pm 3.20$  kg [ $-3\%$ ],  $p = 0.00028$  and waist circumference  $-4.46 \pm 6.72$  cm [ $-4\%$ ],  $p = 0.0097$ .<sup>3</sup>
- 12hrs of fasting 3-days a week for six weeks shows significant change in blood lipid levels LDL reduced ( $-5.24 \pm 2.14$  mg/dl;  $p = 0.020$ ), HDL increased HDL ( $3.04 \pm 0.27$  mg/dl ( $p = 0.0001$ ), Total Cholesterol decreased ( $-16.08 \pm 4.53$  mg/dl;  $p = 0.001$ ) and Triglycerides decreased ( $-12.82 \pm 4.57$  mg/dl;  $p = 0.008$ ).<sup>4</sup>
- Alternate Day Fasting (ADF) shows greater reduction in Triglycerides and LDL cholesterol when compared to Calorie Restriction (CR) and to exercise alone.<sup>5</sup>



Varady KA, Bhutani S, Klempl MC, Kroeger CM. Comparison of effects of diet versus exercise weight loss regimens on LDL and HDL particle size in obese adults. *Lipids in Health and Disease*. 2011;10(1). doi:10.1186/1476-511x-10-119

### Proposed Mechanisms of how intermittent Fasting Reduces Cardiovascular Risk Factors<sup>7</sup>



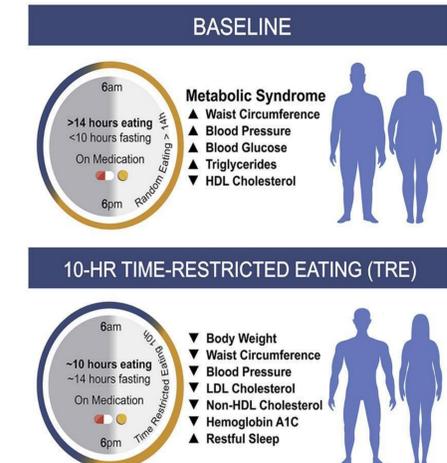
Dong TA, Sandesara PB, Dhindsa DS, et al. Intermittent fasting: A heart healthy dietary pattern? *The American Journal of Medicine*. 2020;133(8):901-907. doi:10.1016/j.amjmed.2020.03.030

### Cardio Metabolic Effects of IF/TRE (Blood Glucose & Blood Pressure)

- Three patients diagnosed with Type 2 Diabetes able to stop all insulin therapy and two were able to stop all diabetes medication following a 24hr alternate day fasting technique or tri-weekly fasting technique.<sup>8</sup>
- In diabetic mouse (db) models it was shown that db mice using intermittent calorie restriction showed better glycemic control and insulin sensitivity than those on just calorie restriction.<sup>9</sup>
- Fourteen subject diagnosed with metabolic syndrome fasted from dawn to sunset (average of 14hrs) for four weeks showed significant blood pressure reductions systolic ( $P = 0.023$ ), diastolic ( $P = 0.002$ ) and mean ( $P = 0.002$ ) arterial blood pressures.<sup>10</sup>

## Conclusion

- Overall intermittent fasting has shown to have positive effects on all realms of cardio metabolic risk from lowering LDL, Triglycerides, Cholesterol levels and raising HDL levels, to weight loss decreasing blood pressure and increasing glucose sensitivity and lowering HbA1c levels/glucose levels.<sup>1-10</sup>
- While IF and TRE do show positive effects in these areas it is still yet to be determined whether IF mechanism itself is the result of the positive effects or if fasting general calorie restriction or that study populations would have positive results from any dietary/lifestyle modifications is the cause?
- Though there is promising research more studies are needed on the exact mechanisms of IF compared to calorie restriction and other dietary modifications in healthy and unhealthy populations.



Wilkinson MJ, Manoogian ENC, Zadorian A, et al. Ten-hour time-restricted eating reduces weight, blood pressure, and atherogenic lipids in patients with metabolic syndrome. *Cell Metabolism*. 2020;31(1):92-104. doi:10.1016/j.cmet.2019.11.004

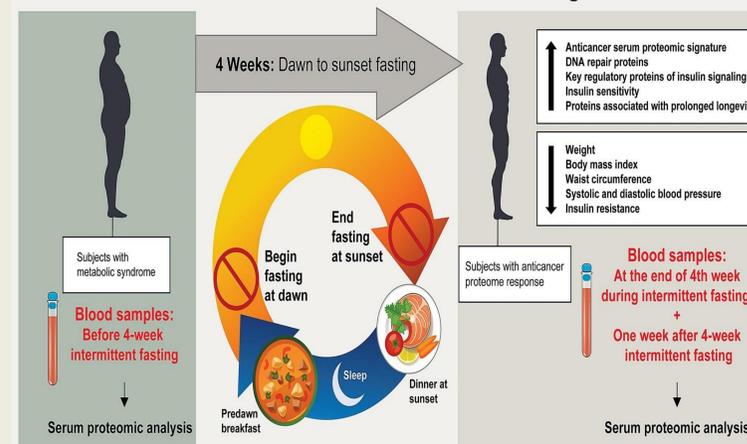
## IF/TRE Effects Without Inducing Weight Loss

- Trial of pre-diabetic men: participants diets were controlled not to induce weight loss. Fasting period was 18 hours. Study group fed same as control group only eating window was changed for 5 weeks.<sup>6</sup>

### Fasting group showed

- Decreased fasting insulin by  $3.4 \pm 1.6$  mU/l ( $p=0.05$ ).<sup>6</sup>
- Increase B-Cell Responsiveness by  $14 \pm 7$  U/mg ( $p=0.05$ ).<sup>6</sup>
- Morning Systolic and Diastolic blood pressure decreased by  $11 \pm 4$  mm Hg ( $p=0.03$ ) and  $10 \pm 4$  mm Hg ( $p=0.03$ ).<sup>6</sup>
- Reduced Oxidative Stress Lipids by 14% in 5 weeks.<sup>6</sup>

## Intermittent Fasting from Dawn to Sunset for Four Weeks is Associated with Anticancer Proteomic Signature



Mindikoglu AL, Abdulsada MM, Jain A, et al. Intermittent fasting from dawn to sunset for four consecutive weeks induces anticancer serum proteome response and improves metabolic syndrome. *Scientific Reports*. 2020;10(1). doi:10.1038/s41598-020-73767-w

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