

# The Circadian Code

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BY

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# About The Author

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LOSE WEIGHT,  
Supercharge Your Energy,  
and Transform Your Health  
from Morning to Midnight

THE  
CIRCADIAN  
CODE

SATCHIN PANDA, PHD



Dr Panda is the leading expert in the field of circadian rhythm research. He is Associate Professor in the Regulatory Lab at the Salk Institute, a Pew Scholar and a recipient of the Dana Foundation Award in Brain and Immune System Imaging.

After completing M.S. in Biotechnology and working in Tamilnadu, he moved to the USA for higher studies. His research at the Salk Institute, San Diego has focused on circadian rhythms.

<https://corporate.eppendorf.com/en/company/scientific-awards/global-award/prize-finalists/2003-satchin-panda/>

<https://www.amazon.in/Circadian-Code-Supercharge-Transform-Midnight/dp/163565243X>

# What is Circadian Rhythm?

Circa, meaning “around” (or “approximately”), and diēm, meaning “day.”

Circadian rhythms are real biological processes that every plant, animal, and human exhibits over the course of a day.

Jeffrey C. Hall, Michael W. Young and Michael Rosbash  
2017 Nobel Prize winners discoveries of molecular  
mechanisms controlling the circadian rhythm



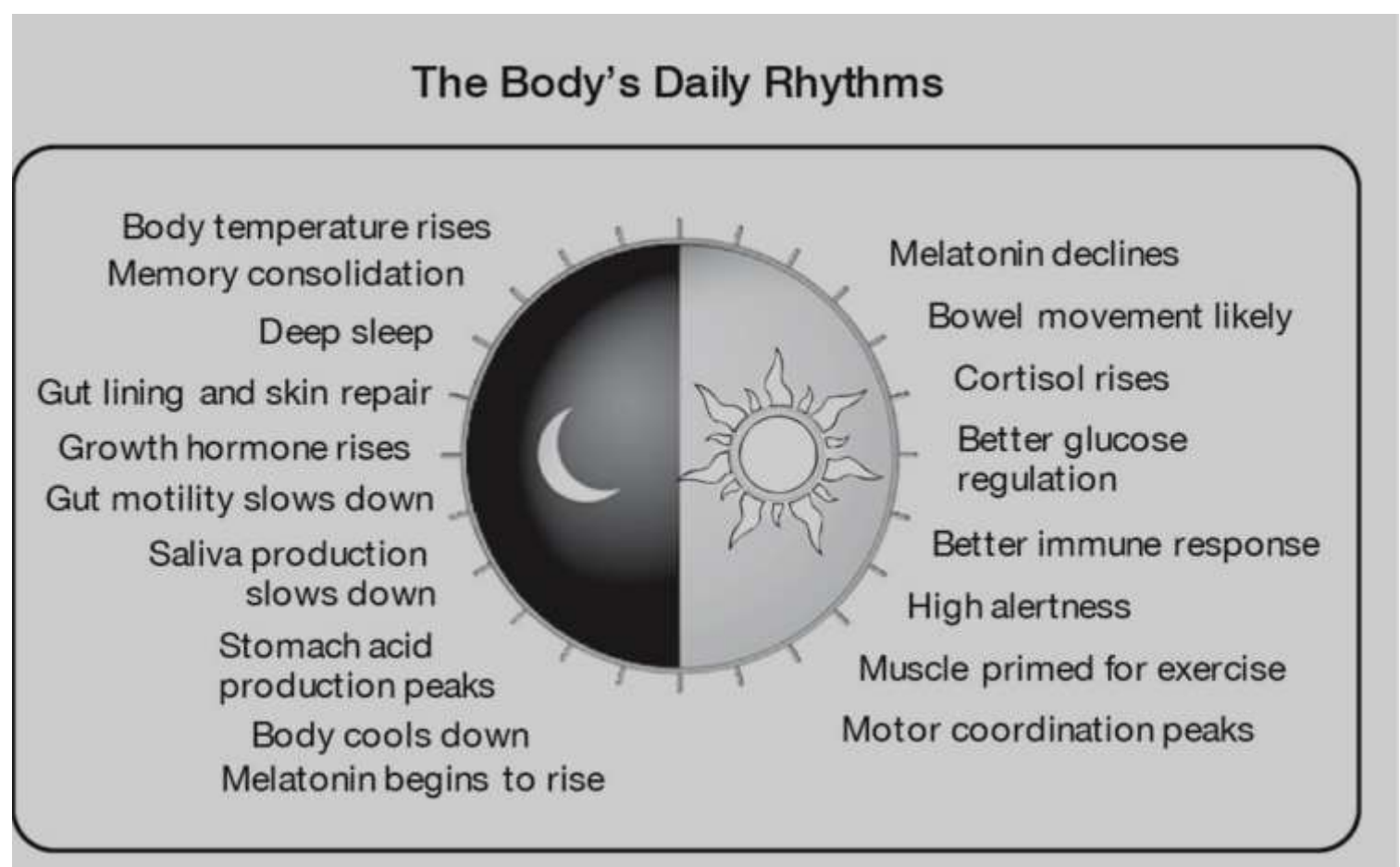
<https://www.nobelprize.org/prizes/medicine/2017/press-release/>

<https://www.theverge.com/2017/10/2/16396498/nobel-prize-in-medicine-2017-michael-rosbash-jeffrey-hall-michael-young-circadian-rhythm>

<https://www.theguardian.com/science/2017/oct/02/nobel-prize-for-medicine-awarded-for-insights-into-internal-biological-clock>

# Circadian Rhythm

- Circadian rhythms are biological processes or 'clocks' that exist in each one of our cells.
- They are programmed to turn genes on or off at different times of the day or night
- They influence every aspect of our health from weight and energy levels through to resistance to disease and infection, and how well we sleep



***The above pattern for humans haven't changed since the existence.***

# What is a Shift Worker

A person who stays awake for more than 3 hours between 10:00 p.m. and 5:00 a.m. for more than 50 days in a year fits the official European definition of a shift worker.

## Types of Shift Workers:

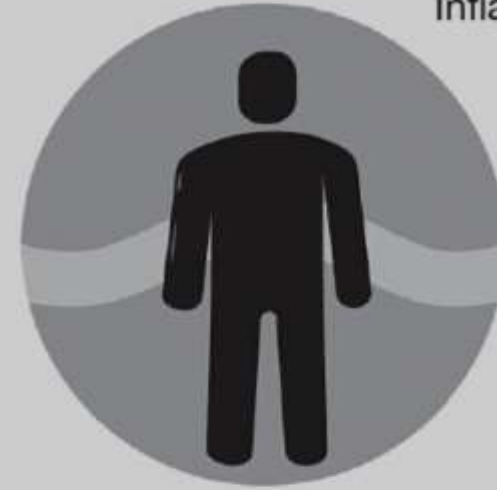
- **Traditional shift worker:** Emergency services like healthcare, police, manufacturing/construction, transportation(air/ground) etc.
- **Shift-work-life lifestyle:** School and college students, musician, performing artists, new mothers etc.
- **Jobs in gig economy:** ride share services, food delivery, free lancers
- **Jet lag:** travellers across time zones.
- **Social jet lag:** Sleeps late and gets up late by 2 hours on weekends.
- **Digital jet lag:** Persons who chats with friends/colleagues several times zones away and hence stays awake for more than 3 hours between 10PM to 5AM.
- **Seasonal Circadian disruption:** people living in extreme north and south latitudes(Sweden, Norway, Northern Canada etc.) who experience 8 hours of daylight during winter and 16 hours in summer.

# Breakdown of Circadian Rhythm

- Almost one-third of all adults suffer from at least one chronic disease - obesity, diabetes, cardiovascular disease, hypertension, respiratory disease, asthma, or chronic inflammation.
- By the time of retirement adults in the United States typically have two or more chronic diseases.

## What Happens When Circadian Rhythms Break Down?

ADHD	Polycystic ovarian syndrome	Leaky gut
Autism	Irregular menstrual cycle	Indigestion
SAD	Post-partum depression	Heart burn
Anxiety	Inability to conceive	Stomach pain
Panic attack	Morning sickness	Crohn's disease
Depression	Miscarriages	Ulcerative colitis
Compromised learning		Inflammatory bowel syndrome
Nocturnal epilepsy		Inflammatory bowel disease
Bipolar syndrome		Metabolic syndrome
ICU Delirium		Weight gain/Obesity
Migraine		Childhood obesity
PTSD		Type 2 Diabetes
Seizure		Prediabetes
Mania		Stroke
Psychosis		Dyslipidemia
Multiple Sclerosis		Hypertension
Huntington Disease		Heart Arrhythmia
Alzheimer's Disease		Chronic Kidney Disease
Parkinson's Disease		Fatty Liver Disease (NAFLD)
Bacterial Infection	Insomnia	Steatohepatitis (NASH)
Sleeping sickness	Prader-Willie syndrome	Ovarian cancer
Malaria	Smith-Magenis syndrome	Breast cancer
Arthritis	Obstructive Sleep Apnea	Liver Fibrosis
Asthma	Delayed sleep phase syndrome	Colon cancer
Allergy	Non-24-hour sleep-wake syndrome	Liver cancer
Lymphoma	Familial advance sleep phase syndrome	Lung cancer



# Three core Rhythms:

➤ **Sleep**

➤ **Nutrition**

➤ **Activity**

## ➤ Rhythm One: Sleep

- **Sleep:** As a child you need 9 hours of sleep and grown ups need 7 hours of sleep

## ➤ Rhythm Two: When You Eat Affects Your Clock

- **Just like the first light of the morning resets our brain clock, the first bite of the day resets our organ clocks. In fact, food timing can be a powerful cue to override the master signal from the SCN master clock.**

## ➤ Rhythm 3. The Effect of Physical Activity on Timing

- **Most of the muscles are activated when we do physical activity. Physical activity has immense benefits for health, and some activity may have an effect on the circadian clock.**

# Nutrition Science

All of nutrition science is based on two experiments:

1) Calorie Restrictions: Eat less, lose weight and achieve better health.

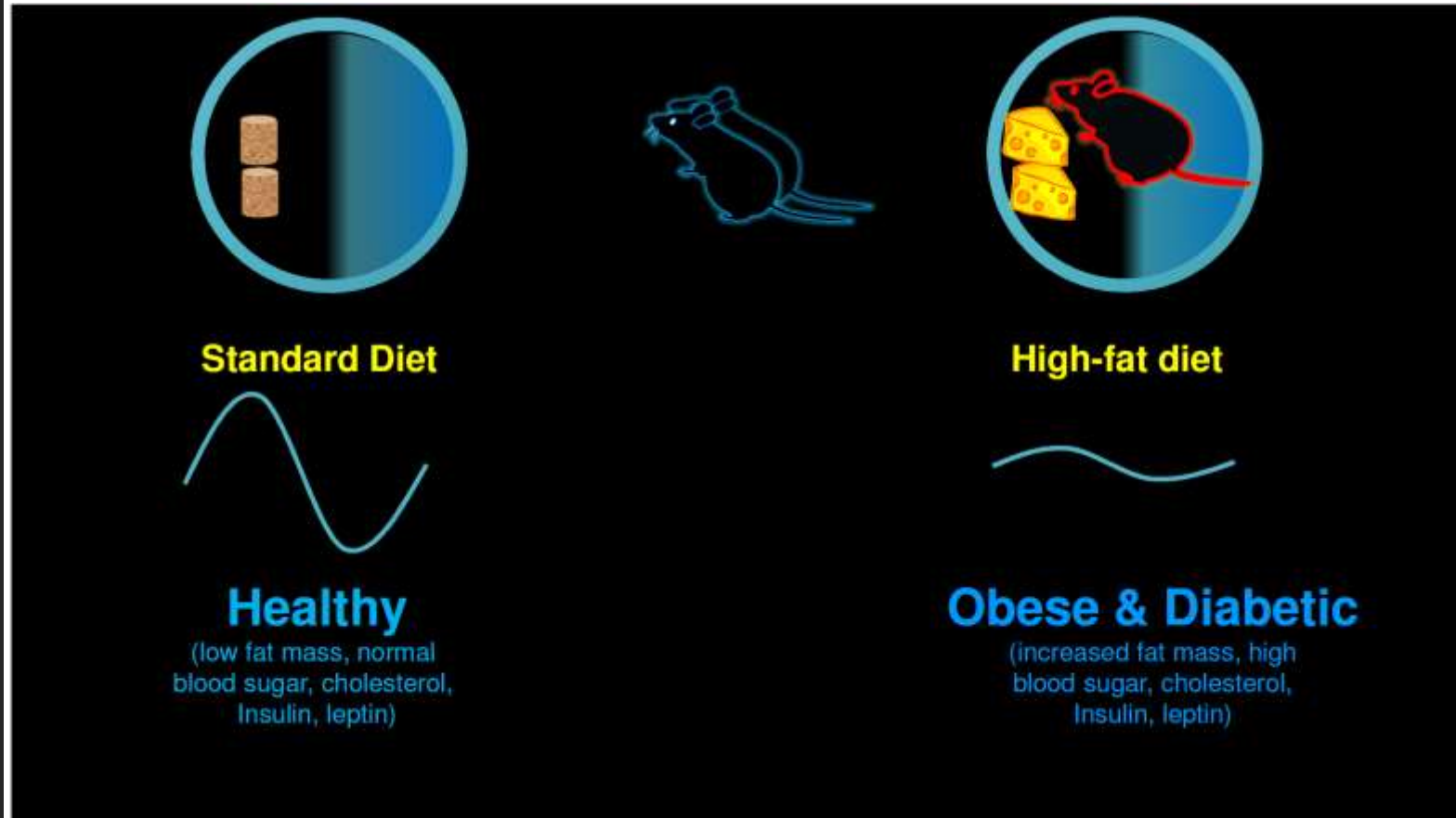
2) Healthy Diet: quality of your food—its nutritional content—matters significantly



# The Circadian Lifestyle

## Standard vs High-fat Diet

### Experiments on Diet: Results on Mice



# The Circadian Lifestyle

## Time Restricted Eating(TRE)

### Experiments on Diet: Result on Mice

Over the first 12 weeks of the study, when the mice ate the same number of calories following the same high-fat/high-sugar diet had been shown to cause severe metabolic diseases, but within an 8-hour window, they were completely protected from the diseases normally seen with a poor diet. The time-restricted eating mice didn't gain excess weight, and they had normal blood sugar and normal cholesterol levels.

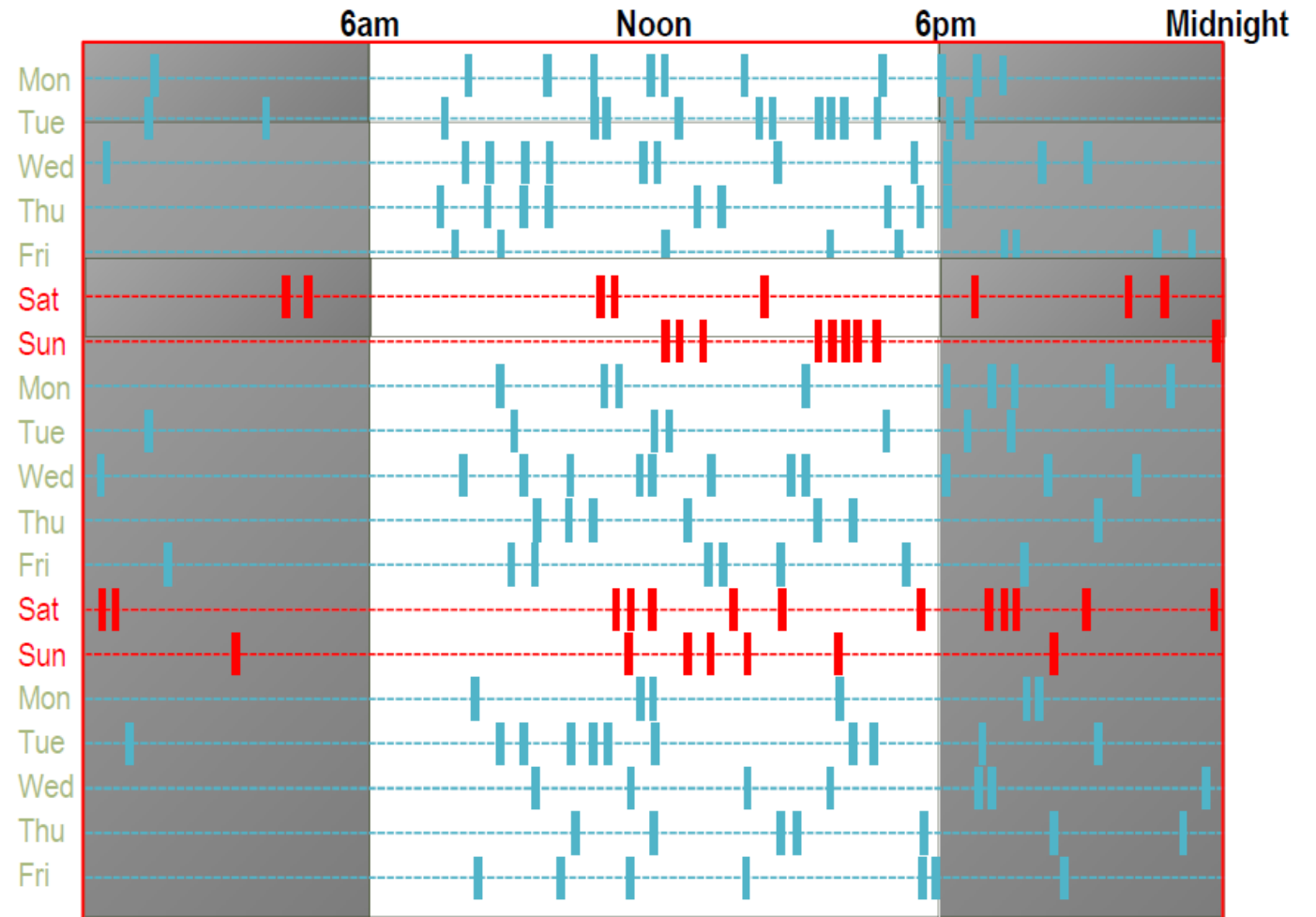


# The Circadian Lifestyle

## Eating Duration: Human Study

### How many hours do we eat?

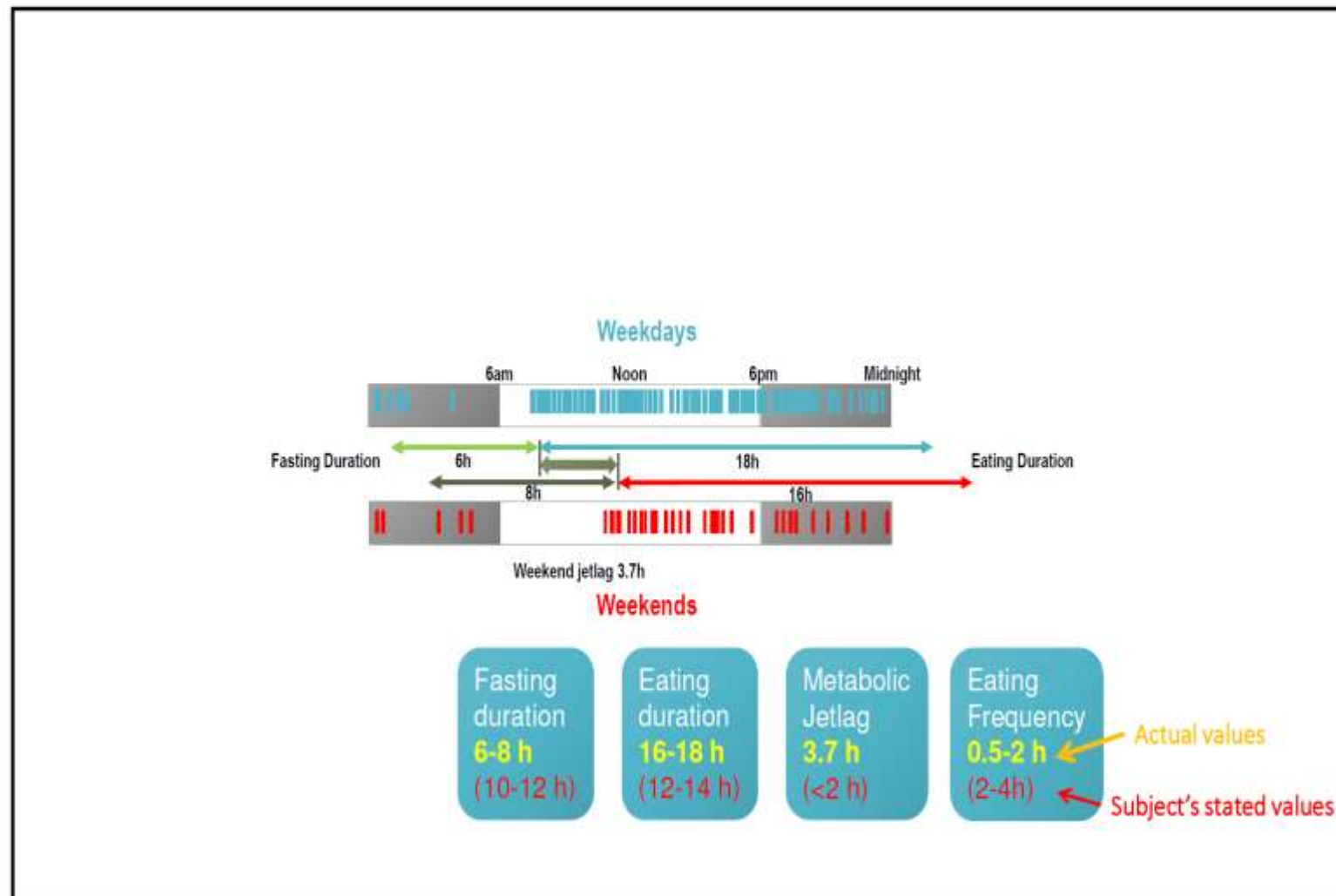
Human study: 2015 Study of 156 people



# The Circadian Lifestyle

## Eating: Human Study

### How many hours do we eat?



# The Circadian Lifestyle

## Time Restricted Eating (TRE)

### Time Restricted Eating (TRE)

- Restrict your food intake to 8-12 hours. While 12 hours is impressive, lowering your window (to as few as 8 hours) is significantly advantageous.
- We've found the best results for weight loss come with eating within an 8-or 9-hour window, and you can maintain this pattern until you get the desired results. Most of your body's fat burning happens 6 to 8 hours after finishing your last meal and increases almost exponentially after a full 12 hours of fasting, making any amount of time fasting past 12 hours highly beneficial for weight loss. Once you've achieved your desired weight loss, you can go back to an 11-or 12-hour window and maintain that body weight.

We believe that a shortened feeding period provides the digestive system the right amount of time to perform its function uninterrupted by a new influx of food, and enough time to repair and rejuvenate, supporting the growth of healthy bacteria in the gut.

## Important links/References:

- <https://www.youtube.com/watch?v=-R-eqJDQ2nU>
- [https://www.youtube.com/watch?time\\_continue=25&v=-R-eqJDQ2nU&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=25&v=-R-eqJDQ2nU&feature=emb_logo)
- [https://www.youtube.com/watch?v=LJ9Ae\\_j\\_kjI&t=40s](https://www.youtube.com/watch?v=LJ9Ae_j_kjI&t=40s)

***Thank You***