Role of Sirtuins in Diabetes and Age-Related Processes

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Background

- Intermittent fasting is a widely adopted diet trend due to its feasibility and reported high success rate
- Intermittent fasting → state of caloric restriction → ↑ sirtuin proteins (SIRTs)
- 7 isoforms of SIRTs exist in humans with a wide variety of functions.
- SIRTs = class of nicotinamide adenine dinucleotide (NAD) dependent lysine-specific deacetylases and represent homologs of yeast silent information regulator (SIR2)
- Evolving field with SIRT-specific activators are being revealed.

Methods

5 searches in PubMed:
"Sirtuin" and "Diabetes" in title
"Sirtuin" and "Fasting" in title
"Sirtuin" and "Vascular" in title
"Sirtuin" and "Age" in title
"Sirtuin" and "Review" in title
Total = 116 papers

Results

SIRTs appear to have a positive impact on the aging process in part by limiting the negative effects of inflammatory mediators and metabolic stressors. Positive implications of SIRTs in type 2 diabetes mellitus include decreased insulin resistance, maintenance of renal function, and minimal cognitive impairment.

Examples of SIRT Activators:

SRT1720 (1000x increase) & Resveratrol (13x increase) =
prevent cardiovascular disease, protect pancreatic cells, decrease chronic inflammation, and alleviate metabolic syndrome by acting as a free radical scavenger

Grapes, Red Wine, Peanuts → Resveratrol = SIRT1 Activator → Delay Age-Related Diseases

Other SIRT activators are found in green tea, turmeric, kale, etc.

Discussion

An evolving understanding of SIRTs remains fundamental in providing potential treatment alternatives against age-related diseases.

7 SIRTs have been described in humans in different locations of the cell with corresponding functions including gene transcription, DNA repair, and protection against oxidative damage.

SIRTs play a controversial role in the progression of cancer as they normally protect against oncogenic transformation, but excessive activity can have potential tumorigenic properties.

References

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