



EDUCACIÓN

SECRETARÍA DE EDUCACIÓN PÚBLICA



Planeación didáctica del docente en línea

Licenciatura: NUTRICIÓN APLICADA

Asignatura: BIOQUÍMICA METABÓLICA

Competencia general de la asignatura:

Analizar el metabolismo de los macronutrientes, por medio de las rutas metabólicas para asociar el requerimiento de energía en el ciclo del alimento-ayuno.

Competencia específica: Destaca la importancia médico-nutricional relacionando las alteraciones y condiciones clínicas con el déficit o exceso de nutrientes.

Asignación a cargo del DL.

1.-Realiza una investigación de los tipos de dietas que existen, mínimo 4, por ejemplo, dietas de ayuno intermitente, cetogénicas, hipercalóricas, hipocalóricas, proteica, etc. descríbelas y explique fundamento metabólico en cada caso, todas sus respuestas deben estar respaldadas con bibliografía en formato APA de revistas de prestigio académico.

2.- Leer el siguiente artículo:
Sha Xu, Hui Tao, Wei Cao, Li Cao, Yan Lin, Shi-Min Zhao , Wei Xu, Jing Cao , Jian-Yuan Zhao . (2021). Ketogenic diets inhibit mitochondrial biogenesis and induce cardiac fibrosis. Agosto 2022, de PubMed Sitio web: <https://pubmed.ncbi.nlm.nih.gov/33558457/>
¿Después de revisar el artículo anterior en una o dos cuartillas comenta utilizando algunos otros artículos sobre el tema qué opinas de este tipo de dietas?
Si estás de acuerdo o en contra de esta dieta explica por qué es así justificarlo con artículos de revistas de prestigio académico mínimo dos artículos para justificar tu respuesta.

	SÍ	NO	PUNTAJE MÁXIMO 100 PUNTOS
Investigación de los tipos de dietas mínimo 4			50%
Análisis y opinión sobre el artículo sugerido			50%
TOTAL			100

Fecha límite de entrega 28 de marzo del 2023.

Signal Transduction and Targeted Therapy

ARTICLE OPEN

Ketogenic diets inhibit mitochondrial biogenesis and cardiac fibrosis

Sha Xu^{1,2}, Hui Tao³, Wei Cao³, Li Cao¹, Yan Lin¹, Shi-Min Zhao^{1,2}, Wei Xu^{1,2}, Jing Cao⁴ and Jian-Yuan Zhao¹

In addition to their use in relieving the symptoms of various diseases, ketogenic diets (KDs) have also been used by individuals to prevent being overweight. Herein, we reported that prolonged KD exposure induced cardiac fibrosis. Frequent deep fasting decreased mitochondrial biogenesis, reduced cell respiration, and increased cardiomyocyte apoptosis. Mechanistically, increased levels of the ketone body β-hydroxybutyrate (β-OHB), an HDAC2 inhibitor, decreased histone acetylation of the *Sirt7* promoter and activated *Sirt7* transcription. This in turn inhibited the transcription of ribosome-encoding genes and mitochondrial biogenesis, leading to cardiomyocyte apoptosis and cardiac fibrosis. β-OHB administration mimicked the effects of a KD in rats. Notably, increased β-OHB levels and SIRT7 expression inhibited mitochondrial biogenesis, and increased cardiac fibrosis were detected in human atrial fibrillation heart tissue. These findings highlighted the unknown detrimental effects of KDs and provided insights into strategies for preventing cardiac fibrosis for whom KDs are medically necessary.

Signal Transduction and Targeted Therapy (2021)6:54 ; <https://doi.org/10.1038/s41392-020-00400-0>

INTRODUCTION

The low-carbohydrate, high-fat ketogenic diet (KD) is a remarkably effective treatment for medically intractable epilepsy and has been applied in the clinical setting for over 70 years.¹ In addition, KDs have been widely applied in the clinical treatment of various diseases, such as diabetes,² cancer,^{3,4} and neurological disorders, including Alzheimer’s disease and Parkinson’s disease.⁵ KDs are also used by healthy individuals, predominantly to promote weight loss.⁶

Consumption of a KD forces the body to use fats rather than carbohydrates to generate energy. Three major forms of ketone bodies, namely acetoacetate (AcAc), β-hydroxybutyrate (β-OHB), and acetone, are generated in the liver during fatty acid oxidation and transported to extrahepatic tissues by the circulatory system. Circulating total ketone body concentrations in healthy adult humans normally exhibit circadian oscillations of ~100–250 μM. However, levels can reach 1–8 mM after KD consumption, prolonged exercise, or deep fasting and can be as high as 25 mM under pathological conditions, such as diabetic ketoacidosis.^{7–10} β-OHB accounts for 70% of ketone bodies and has been suggested to be beneficial because it not only serves as a vital alternative metabolic fuel source in the fed, fasted, and starved states¹¹, but also exerts antioxidative,¹² antiaging,¹³ and anti-inflammatory effects.¹⁴

Although numerous reports have acknowledged the beneficial effects of β-OHB, its safety has been challenged by certain clinical

lines of evidence related to its effects on cardiovascular diseases. For example, the concentration of β-OHB is significantly higher in patients with atrial fibrillation. In addition, increased circulating β-OHB is independent of and associated with major adverse cardiovascular events in hemodialysis.¹⁶ Moreover, diabetes, which is associated with high levels of ketone bodies, constitutes a major factor for cardiovascular diseases, including coronary artery disease, and stroke.^{17,18} The potential detrimental effects of KDs have also been implicated in clinical studies. For example, the occurrence of unknown etiology has frequently been detected in the KD group in various studies.^{19–21} Moreover, a study of a large cohort found that a low-carbohydrate diet was associated with increased mortality,²² although whether the KD directly increased the incidence of cardiovascular disease, a major factor that affects life expectancy, together, these findings suggest that KD consumption and β-OHB accumulation may increase the risks of cardiovascular diseases, suggesting that long-term consumption of KDs should be carefully considered.

In this study, we examined the effects of prolonged β-OHB accumulation on cardiovascular biology and metabolism in cells, animal models, and clinical samples in order to clarify the potential negative effects of KDs and the underlying mechanisms.

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Después de revisar el artículo anterior ¿qué opinas de este tipo de dietas?

	Expresa tu opinión Si estás de acuerdo o en contra de esta dieta explica por qué es así justificarlo con artículos de revistas de prestigio académico mínimo dos artículos para justificar tu respuesta.	
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