Biochemistry & Physiology: Open Access

Jenssen, Biochem Physiol 2024, 13:1

The Dual Nature of Methylglyoxal: Biochemistry and Toxicology Perspectives

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Despite the burgeoning interest in methylglyoxal and glyoxalases, their precise roles within the metabolic network remain elusive. While several reviews have emerged in this area, they often focus on narrow segments of research. This article seeks to provide a comprehensive overview of methylglyoxal research, expanding the discussion from its chemistry to its biological implications. The review encompasses important characteristics of methylglyoxal metabolism and toxicity across various species, shedding light on its effects on energy production, free radical generation, and cell viability. It also delves into the environmental production of α-oxoaldehydes as potential risk factors and their potential involvement in diseases. Ultimately, the review concludes that while the methylglyoxalase pathway's function has been intricately linked to carbohydrate metabolism since the early stages of evolution, its significance has evolved over millennia. This evolution underscores the dynamic nature of methylglyoxal's role within living systems and emphasizes the need for continued exploration in this field.

Introduction

Biochemical significance

Toxicological implications

Conclusion

17-Jan-2024, QC No. bcp-24-134363; 23-Jan-2024, Manuscript No. bcp-24-134363 (R); 31-Jan-2024, DOI: 10.4172/2168-9652.1000448

Jenssen JM (2024) The Dual Nature of Methylglyoxal: Biochemistry and Toxicology Perspectives. Biochem Physiol 13: 448.

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