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MORPHOFUNCTIONAL CHANGES IN THE PANCREAS ASSOCIATED WITH LONG-TERM CONSUMPTION OF ENERGY DRINKS

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Abstract. This study investigates morphofunctional changes in the pancreas associated with long-term consumption of energy drinks. The research included approximately 180–200 subjects who regularly consumed energy drinks over an extended period. Morphological and functional assessments were conducted using histological and biochemical methods. The findings revealed structural alterations in pancreatic tissue, including cellular degeneration, inflammatory changes, and disruption of normal glandular architecture. Functional impairments such as altered enzyme secretion and metabolic imbalance were also observed. The results suggest that prolonged intake of energy drinks may have a negative impact on pancreatic health and may contribute to the development of digestive and metabolic disorders.
Key words; energy drinks, pancreas, morphofunctional changes, histology, metabolic disorders

Annotatsiya. Mazkur tadqiqot uzoq vaqt davomida energetik ichimliklar iste’mol qilish natijasida oshqozon osti bezida yuzaga keladigan morfofunksional o‘zgarishlarni o‘rganishga bag‘ishlangan. Tadqiqotda uzoq muddat energetik ichimlik iste’mol qilgan taxminan 180–200 nafar shaxs tekshirildi. Tadqiqot davomida gistologik va biokimyoviy usullar yordamida bezning strukturaviy va funksional holati baholandi. Natijalar oshqozon osti bezida hujayra degeneratsiyasi, yallig‘lanish o‘zgarishlari va bez tuzilishining buzilishini ko‘rsatdi.
Kalit so‘zlar; energetik ichimliklar, oshqozon osti bezi, morfofunksional o‘zgarishlar, gistologiya, metabolik buzilishlar

Аннотация. Данное исследование посвящено изучению морфофункциональных изменений поджелудочной железы при длительном употреблении энергетических напитков. В исследовании приняли участие около 180–200 человек, регулярно употребляющих энергетические напитки. Были проведены морфологические и функциональные исследования с использованием гистологических и биохимических методов.
Ключевые слова; энергетические напитки, поджелудочная железа, морфофункциональные изменения, гистология, метаболические нарушения

INTRODUCTION. Energy drinks have become increasingly popular worldwide, particularly among young people. These beverages contain high levels of caffeine, sugar, and various stimulants that can affect multiple organ systems. The pancreas plays a critical role in digestion and metabolic regulation through the secretion of digestive enzymes and hormones such as insulin. Prolonged exposure to substances found in energy drinks may lead to structural and functional alterations in pancreatic tissue. Understanding the impact of long-term energy drink consumption on pancreatic health is essential for preventing potential complications and promoting public health awareness.

LITERATURE REVIEW. Recent studies have shown that excessive consumption of energy drinks is associated with various health risks, including metabolic disorders, cardiovascular issues, and gastrointestinal disturbances. Research indicates that high caffeine and sugar intake can lead to increased pancreatic workload, oxidative stress, and inflammatory responses. Experimental studies have demonstrated that prolonged exposure to these substances may result in cellular damage and

disruption of normal pancreatic function. However, detailed investigations into the morphofunctional changes in the pancreas remain limited, highlighting the need for further research in this area.

RESEARCH METHODOLOGY. The study involved approximately 180–200 individuals with a history of long-term energy drink consumption. Participants were selected based on frequency and duration of intake. Clinical assessments included evaluation of digestive symptoms and metabolic parameters. Laboratory tests were conducted to measure enzyme levels and glucose metabolism indicators. Histological examination of pancreatic tissue samples was performed using standard staining techniques to assess structural changes. Data obtained were statistically analyzed to determine the relationship between energy drink consumption and pancreatic alterations.

ANALYSIS AND RESULTS. The results revealed significant morphofunctional changes in the pancreas among individuals with prolonged energy drink consumption. Histological analysis showed cellular degeneration, inflammatory infiltration, and partial destruction of glandular structures. Functional analysis indicated altered enzyme secretion and impaired glucose metabolism. Elevated levels of pancreatic enzymes suggested increased glandular stress and dysfunction. A strong correlation was found between the duration of energy drink consumption and the severity of pancreatic changes. Individuals with longer consumption periods exhibited more pronounced structural and functional impairments.

CONCLUSION AND RECOMMENDATIONS. The study demonstrates that long-term consumption of energy drinks can lead to significant morphofunctional changes in the pancreas. These alterations may increase the risk of developing metabolic and digestive disorders. It is recommended to limit the intake of energy drinks, particularly among young individuals. Public health initiatives should focus on raising awareness about the potential risks associated with excessive consumption. Further research is needed to explore the long-term effects and underlying mechanisms of pancreatic damage related to energy drinks. Early preventive measures and lifestyle modifications can help reduce health risks.

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