Impact of nitrosamines on carcinogenesis at the digestive system level

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AIM

Characterize the relationship between nitrosamines formation in carcinogenesis at the digestive system level.

INTRODUCTION

Nitrosamines are organic compounds, potentially carcinogenic to man, which may form as a reaction product between amines by combining these with nitrates, a so-called nitrosation reaction. Endogenous formation also consists of an important source of these compounds and may be formed by activated bacteria or macrophages that catalyze the union of the above compounds. (1)

Human exposure to nitrosamines may occur as a consequence of some habits, such as smoking, but mainly through food, and the processing to which foods are subject influences the amount of nitrosamines formed. (2)

When food is stored under inadequate humidity conditions, they can provide fungus growth in food, particularly Fusarium moniliforme. This fungus is able to reduce nitrates to nitrites and, consequently, in the presence of nitrosatable amines, the nitrosamines are formed. (2)

BIOTRANSFORMATION

Nitrosamines are pre-cancerous, only after a biotransformation reaction they result in final carcinogenic, which will react with the DNA. (3,4)

PRE-MUTAGENIC BASE

There are positions in the DNA capable of being “attacked” by the nitrosamines metabolism products, but the main pre-mutagenic base formed is O6-alkylguanine. (3,4)

DIETHYLNITROSAMINE (Final Carcinogenic)

It is required the activation by the P450 cytochrome isoenzyme that can be found:

- Mitochondria and reticuloendothelial system (liver).
- Cells of the mucosa and in the reticuloendothelial system (esophagus). (1)

NITROSATION (Stomach)

- Due to the low pH, it seems to be a good endogenous synthesis organ. (4)
- Consumption of nitrosamines risk of stomach cancer

CONCLUSION

In conclusion, P450 cytochrome plays a major role in the biotransformation of N-nitrosamines into final carcinogenic in the following organs: esophagus and liver. The stomach is a preferred organ of its formation and may not mean its biotransformation. Nitrosamines are genotoxic substances, which have a high carcinogenic potential. (3)

REFERENCES