

Biogenic Amines and Polyamines: Similar Biochemistry for Different Physiological Missions and Biomedical Applications

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ABSTRACT: Biogenic amines are organic polycations derived from aromatic or cationic amino acids. All of them have one or more positive charges and a hydrophobic skeleton. Nature has evolved these molecules to play different physiological roles in mammals, but maintains similar patterns for their metabolic and intracellular handling. As deduced from this review, many questions still remain to be solved around their biochemistry and molecular biology, blocking our aims to control the relevant pathologies in which they are involved (cancer and immunological, neurological, and gastrointestinal diseases). Advances in this knowledge are dispersed among groups working on different biomedical areas. In these pages, we put together the most relevant information to remark how fruitful it can be to learn from Nature and to take advantage of the biochemical similarities (key protein structures and their regulation data on metabolic interplays and binding properties) to generate new hypothesis and develop different biomedical strategies based on biochemistry and molecular biology of these compounds.

KEY WORDS: arginine/ornithine-derived amines, histamine, neurotransmitter amines, decarboxylases, amino oxidases, amine transport systems.

I. INTRODUCTION

Biogenic amines are natural products related to intercellular communication and, as such, present in specific cell types, globally called amine-handling cells. The most relevant ones in mammalian physiology are serotonin, histamine, dopamine, and noradrenaline. On the other hand, arginine/ornithine-derived polyamines, although they might also be considered biogenic amines,

are not only involved in biosignaling and are present not only in amine-handling cells. They are ubiquitous in localization (in fact, they are present in almost every kind of cell) and have pleiotropic effects, with a recognized major role as essential compounds in maintaining macromolecular synthesis and cell proliferation rates (Cohen, 1998). Figure 1 shows the main biogenic amines and arginine/ornithine-derived polyamines. The relationship between these amine compounds and human pathologies

Polyamines In Biomedical Research

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