

## Role of polyamines in gastrointestinal mucosal growth

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Received: November 29, 1999  
Revised: December 24, 1999  
Accepted: January 9, 2000  
Published online: September 15, 2000

### Abstract

The polyamines [putrescine (PU), spermidine (SPD) and spermine (SPM)] are ubiquitous polycationic compounds found in all prokaryotic and eukaryotic cells, are essentially involved in a variety of regulatory steps during normal, adaptive, and malignant cell proliferation. Nearly four decades investigation about the polyamines contributed to the synthesis and decomposition of polyamines and the active and passive enzymes which regulate them at different levels. This review focuses on the sources and homeostasis of intracellular polyamines, the transport and role of the

polyamines in the growth of the gastrointestinal mucosa and their possible mechanism. We tried to point out the gaps remaining in the story and give a working hypothesis for the role of polyamines in gastrointestinal mucosal growth. We propose in the hypothesis that polyamine is a "key" to unlock the "door" of cell proliferation. How many "doors" between the "polyamine key" and the "real start" of proliferation? The polyamine might be the only key for cell proliferation. Another possibility is that polyamine is the first key and its "unlocking effect" resulting in getting another key for the next door in the proliferation chain, for example, proto-oncogenes. To decide whether polyamine is an intermediate step or just only one step of cell proliferation, the possible way is to keep polyamine to be a stimulus and find a way to deprive the function of proto-oncogene protein (or other possible gene expression product) to check the effect on the cell proliferation. Another important question is how polyamine can trigger the synthesis of DNA in virtual. Arabinose operon model may give us some ideas to investigate about that. And furthermore, it is necessary to pay attention to the relationship between polyamine and other cell proliferation regulator, like growth factor, chalone, cAMP, cGMP, *etc.* Further studies are needed to investigate the mechanism of polyamine acted on the gastrointestinal mucosal growth.

**Key words:** Polyamines; Spermidine; Spermine; Difluoromethylornithine; Ornithine decarboxylase; Gastrointestinal motility; Gastrointestinal mucosal growth

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Bian ZX, Wang JH. Role of polyamines in gastrointestinal mucosal growth. *World J Gastroenterology* 2000; 6(Suppl 3): 47 Available from: URL: <http://www.wjgnet.com/1007-9327/full/v6/iSuppl3/47.htm> DOI: <http://dx.doi.org/10.3748/wjg.v6.iSuppl3.47>

E- Editor: Hu S



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