Title: Molecular interaction of acylpolyamine Mygalin with bacterial DNA

Authors: Espinoza-Culupú, A.O [1], Melo, B.S [1], Nascimento N.L.A [1], Nascimento, A.C.C [1], Santos, J.C [1], Silva, Jr. P.I [2], Borges, M.M. [1]

Institution: [1] Lab. Bacteriologia, [2] Lab. Especial de Toxinologia Aplicada CAT/ Cepid, Instituto Butantan, São Paulo, Brazil, Av. Vital Brasil, 1500 – Butantã, São Paulo, SP, 05503-900.

Abstract:

The emergence of new antibiotic-resistant pathogens stresses the need to study alternative ways to combat infections, identifying molecules that can act directly or indirectly on the bacteria. The natural polyamines are present in all living cells, may bind to DNA, ribosomal and RNA, regulating protein synthesis, cell growth and differentiation, depending on the number of inserted amino groups in this molecule, which confers characteristics to the molecule. Some polyamines protects the bacteria against toxic action of the external environment as oxidative stress, pH acid and other toxic agents Synthetic Migalina was originally isolated as bis-acylpolyamine N1, N8-bis (2,5-dihidroxibensoil) from hemocytes of *Acanthoscurria gomesiana* spider that has a microbicidal activity. This study analyzes the interaction of Mygalin (1, 0.5, 0.25, 0.125, 0.06 and 0.3 mM) and Spermidine (2, 1, 0.5, 0.25, 0.125 and 0.06 mM) with bacterial DNA of *Escherichia coli*, strain DH5α (for 2, 5 and 24 hours of treatment at 37°C. Was monitored by agarose gel electrophoresis using the reaction mixture containing 1µg of DNA. These data were compared with commercial spermidine. The result of DNA interaction studies indicate that Mygalin at 1 and 0.5 mM interacted with bacterial DNA causing molecular damage for 5 and 24 hours The treatments with lower doses, as well as spermidine, cause no damage in DNA. The data found at agarose gel are in accordance with the quantification of DNA UV spectrometry, where the treatment with higher doses Migalina (1 and 0.5 mM) did not result in measurable levels of DNA, whereas with 0.25mM there was 50% reduction compared to the untreated control, while in the treatment with spermidine 2mM and 1mM the reduction was 10%. In Conclusion: Mygalin and spermidine differs in its interaction with DNA, which confers a specific characteristic to this molecule.

Key Words: Mygalin, spermidine, polyamines, molecular damage

Financial Support: FAPESP (2013/11212-9 e 2014/04307-6) and Butantan Foundation.