

## Plant biopolymers from *Boraginaceae* family species and their synthetic derivatives: prospective pharmacological agents

K Mulkijanyan, V Barbakadze, M.Merlani, L Gogilashvili, L Amiranashvili, Zh.Novikova and M Sulakvelidze  
Tbilisi State Medical University, USA

Extracts from the plants belonging to Boraginaceae family – *Symphytum asperum*, *S.caucasicum* and *Anchusa italica* have been used in folk medicine in the treatment of some kinds of disorders, mainly fractures and wounds. These extracts contain allantoin, claimed to be a cell proliferation-stimulating agent responsible for the wound-healing properties of Symphytum, and, on the other hand, hepatotoxic pyrrolizidine alkaloids, which strongly restrict internal use of comfrey extracts. Our research group succeeded in obtaining allantoin- and toxic pyrrolizidine alkaloids-free composition containing novel biopolymer from the roots of aforesaid plants – poly[oxy-1-carboxy-2-(3,4-dihydroxyphenyl)ethylene] (BP) and synthesis of its monomer (M-BP). BP and M-BP were studied to appraise their pharmacological properties. Different in vitro and in vivo experiments revealed that the investigated compounds exhibit: i) antioxidant activity and anticomplementary activity due to the inhibition of xantine oxidase and complement convertase, respectively; ii) burn and wound healing properties due to the shortening of the second phase of wound healing - the inflammatory response; iii) inhibition of androgen-dependent and -independent prostate cancer (PCA) cells growth in vitro. Consistent with in vitro results, in vivo study showed that BP strongly inhibited 22Rv1 tumors growth without any toxicity; iv) abrogation of melanoma cells adhesion to tumor-conditioned medium- and VEGF-activated endothelial cells; v) significant stimulation of leucopoiesis in mice drug-induced leukopenia.

Strong efficacy of BP and M-BP in different experimental models suggests its high therapeutic potential.

### Biography

Karen Mulkijanyan is the Head of the Department of Pharmacology at Tbilisi State Medical University Institute of Pharmacochemistry and Adviser on Technology Commercialization to aforesaid Institute's Administration. He obtained his MS in Biochemistry in 1981 and PhD in Pharmacy in 2005. Mulkijanyan's research interests include studying the pharmacology of anti-inflammatory and wound healing drugs and analysis and prediction of structure-activity relationship of natural, modified and synthesized compounds. He is the author and co-author of more than 90 papers in peer-reviewed journals, about 30 presentations at international scientific meetings, and 2 patents.

[karmulk@gmail.com](mailto:karmulk@gmail.com)

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