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## Novel biologically active caffeic acid-derived biopolymer from different species of Boraginaceae family with potential therapeutic effect

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The high-molecular fractions from species of two genera (*Symphytum* and *Anchusa*) of Boraginaceae family *Symphytum asperum*, *S. caucasicum*, *S. officinale* and *Anchusa italica* were isolated. According to IR, <sup>13</sup>C and <sup>1</sup>H NMR, 2D heteronuclear <sup>1</sup>H/<sup>13</sup>C HSQC spectral data, the main structural element of these preparations was found to be a regularly substituted polyoxyethylene, namely poly[3-(3,4-dihydroxyphenyl)glyceric acid] (PDPGA) or poly[oxy-1-carboxy-2-(3,4-dihydroxyphenyl)ethylene]. Such caffeic acid-derived biopolymer to our knowledge has not been known and has been identified for the first time. This compound represents a new class of natural polyethers with a residue of 3-(3,4-dihydroxyphenyl)glyceric acid as the repeating unit. Most of the carboxylic groups of PDPGA from *A. italica* unlike the polymer of *S. asperum*, *S. caucasicum* and *S. officinale* are methylated. The 2D DOSY experiment gave the similar diffusion coefficient for the methylated and non-methylated signals of *A. italica* PDPGA. Both sets of signals fell in the same horizontal. This would imply a similar molecular weight for methylated and non-methylated polymers. *S. caucasicum* PDPGA inhibited the growth of androgen-dependent and -independent prostate cancer (PCA) cells both *in vitro* and *in vivo*. Consistent with *in vitro* results, *in vivo* study showed that PDPGA feeding of mice strongly inhibited 22Rv1 tumors growth by 88% at 5 mg/kg body weight doses for 5 weeks, without any toxicity, together with a strong decrease in androgen receptor and prostate specific antigen expression but increase in apoptosis in tumor tissues from PDPGA-fed mice. Overall, present study identifies PDPGA as a potent agent against PCA without any toxicity, and supports its clinical application.

### Biography

V Barbakadze completed his PhD and DSc at the ages of 33 and 54 years from Zelinsky Institute of Organic Chemistry, Moscow, Russia and Durmishidze Institute of Biochemistry and Biotechnology, Tbilisi, Georgia, respectively. Since 2006 to present, he is the head of laboratory of plant biopolymers at the Tbilisi State Medical University Institute of Pharmacochimistry. 1996 and 2002 he has been a visiting scientist at Utrecht University (faculty of pharmacy), The Netherlands, by University Scholarship and The Netherlands organization for scientific research (NWO) Scholarship Scientific Program, respectively. He has published more than 64 papers in reputed journals.

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