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Efficacy of Zhuling polyporus polysaccharide with BCG to inhibit bladder carcinoma

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There is growing interest in reducing Bacille Calmette-Guerin (BCG) side effects while keeping intact its therapeutic efficacy. In the present study, we evaluated the efficacy of Sclerotia of *Polyporus umbellatus* FRIES (Zhuling) and its main ingredient Polyporus Polysaccharide (PPS) to attenuate side effects of BCG therapy *in vivo*. The results show that bladder cancer development in model rats exhibited significantly reduced cancer invasiveness with Zhuling PPS combined with BCG. Flow cytometric (FCM) analysis showed expression of costimulatory molecules CD86, CD40, and TLR4/CD14 significantly increased with Zhuling PPS in combination with BCG. Similarly, immunohistochemical analysis revealed stronger CD86 and CD40 staining. Our findings show Zhuling PPS strongly reduced side effects and displayed synergistic effects during BCG instillation in rat bladder cancer models. The findings also suggest that the attenuation effect may result from direct activation of dendritic cell (DC) TLR4.

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The development of pharmacological strategy of cell therapy and perspectives for the creation of highly selective drugs for regenerative medicine on the basis of alkaloids

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Background: "Pharmacological strategy of regenerative medicine" based on the principle of imitating the activity of the natural regulatory systems is considered to be the most physiologic and promising approach to solve the problems of regenerative medicine.

Purpose: It is necessary to assess the perspective of developing drugs for regenerative medicine on the basis of alkaloids.

Materials & Methods: The diterpene alkaloids: napellin, zongorin, gipakonitin, meza-konitin, Z77 and others were studied on experimental models of skin wound, cytostatic myelosuppression, posthypoxic encephalopathy, cerebrovascular accident. Histological, functional, cultural, hematologic and other methods were used.

Results: The alkaloids with different types of regenerative activity were revealed. Napellin, zongorin, gipakonitin showed the most expressed wound healing properties, zongorin and napellin – erythro- and granulocytopenia-stimulating ones respectively, and Z77 – cerebro protective one. It was found that a direct effect of these substances on the growth factor receptors of progenitor cells and an increase in the functional activity of tissue microenvironment elements were the mechanisms of their action. In this case, "reserve" intracellular IKK, PKC1, PKB, PKA dependent directions NF- κ B- and p38 MAPK- signaling, which don't participate in the realization of SC growth potential in the optimal conditions of life, were involved in the transfer of stimulating signal to progenitor cells.

Conclusion: Obtained results indicate a high perspective of developing selective drugs for regenerative medicine on the basis of detected alkaloids.

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