Somatostatin analogue: One substance and two formulations

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Statement of the Problem: Neuroendocrine tumors are rare human tumors, which may arise in various tissue and organs. These tumors are characterized by secondary symptoms because of metabolically active substance production. Biotherapy with somatostatin analogues (SA) (Octreotide, Lanreotide, etc.) is now the standard of neuroendocrine tumors treatment. We synthesized new SA substance which is different from well-known by its structure (it is linear) and properties (insoluble in water) and investigated its pharmacological and technological characteristics. The purpose of this study was to create different dosage forms of SA to achieve the best bioavailability and efficiency.

Methodology & Theoretical Orientation: SA tablets were prepared with starch, lactose, povidone, microcrystalline cellulose, etc. by wet granulation method. A lipid film rehydration method modified for hydrophobic substances was used to obtain SA liposomes.

Findings: The best tablet formulation including povidone has characteristics corresponding to requirements of PhEu: desintegration time less than 15 min, resistance to crushing more than 30 N, weight variation <7,5 %, active substance content closed to nominal and consistent SA distribution in the batch. The liposomes with appropriate specifications that included egg lecithin and PEG-2000-DSPE were prepared and characterized by partical size (151±11 nm), pH of the liposomal dispersion (7,2±0,2) and content of somatostatin and AS incorporated in the liposomal bilayer (96±1.6 %). Study of antitumor efficacy was performed on mice transplanted tumor model, mammary adenocarcinoma Ca-755 by oral administration of SA tablets and intravenous administration of liposomal SA. It was found that tablet SA in dose 5 mg showed 85 % tumor growth inhibition (TGI) and liposomal SA in dose of 5 mg/kg 69 % TGI was obtained.

Conclusion & Significance: New SA antitumor action more complete realizes by oral administration. because of SA slow fermentative degradation in gastric fluid and active ingredient release and absorption.

Recent Publications

1. Shprakh ZS, Yartseva IV, Ignateva EV *et al.* (2014) Synthesis and chemico-pharmaceutical characteristics of somatostatin analog with antitumor activity. Pharmaceutical Chemistry Journal 3:159-62.
2. Shprakh ZS, Ignateva EV, Yartseva IV *et al.* (2016) Development and validation of cyphetrylin assay in tablets. Russian Journal of Biotherapy 3:55-61.
3. Sanarova EV, Lantsova AV, Mikhaevich EI *et al.* (2016) The prospect of the creation of a dosage form of domestic analogue of hypothalamic hormone somatostatin in the treatment of hormone-dependent tumors. Russian Journal of Biopharmaceuticals 2:14-9.
4. Konyaeva OI, Kulbachevskaya NYu, Ermakova NP *et al.* (2018) Pre-clinical toxicological study of analogue of hypothalamic hormone. Russian Journal of Biotherapy 2:63-70.
5. Sanarova EV, Lantsova AV, Oborotova NA *et al.* (2019) Development of a Liposomal Dosage Form for a New Somatostatin Analogue. Indian Journal of Pharmaceutical Sciences 1:146-9.

Biography

Zoya Shprakh has her expertise in pharmaceutical and analytical development of innovative antitumor drugs. She is also expert in preclinical and clinical studies. She researched and organized few Russian antitumor drugs manufacture.