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RESEARCH ARTICLE

NANOEMULSION BASED INTRANASAL DELIVERY OF RISPERIDONE FOR NOSE TO BRAIN TARGETING

Shailesh T. Prajapati*, Sarjak P. Pathak, Jalaram H. Thakkar and Chhaganbhai N. Patel

Department of Pharmaceutics, Shri Sarvajanik Pharmacy College, Mehsana-384 001, Gujarat, India

**E-mail*: stprajapati@gmail.com
Tel.: 02762 247711.

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Risperidone nanoemulsion using different mucoadhesive agent as nasal drug delivery system was prepared to produce quick effect as compared to that of oral route. Solubility of drug was determined in different vehicles. Pseudo ternary phase diagram were generated using Acrysol K 150 as oil, tween 80 as a co-surfactant, and caproyl PGMC as a surfactant. The four formulations were prepared by the spontaneous emulsification method and were further characterized for their percentage transmittance, droplet size and zeta potential. *Ex vivo* diffusion study of the optimized batch was carried out using goat nasal mucosa. Histopathological study of the optimized batch was studied. Optimized formulation was found to possess the mean globule size 149 nm and zeta potential -17.3 mV. *Ex vivo* study revealed that at the end of 4 h, 93.76% of the dose was diffused successfully. In histpathological study, formulation treated mucosa did not showed any damage to the epithelium layer.

Key words: Risperidone, Nanoemulsion, Spontaneous emulsification, Nasal ciliotoxicity.

INTRODUCTION

One of the major psychotic disorders is a schizophrenia that frequently has devastating effects on various aspects of the patient's life and carries a high risk of suicide and other life threatening behaviors. The primary goal in management of schizophrenia is to achieve optimal control of symptoms (Nasrallah *et al* 2005). Antipsychotics are a group of powerful psychoactive drugs thought to block specific receptors in the brain that affect the central nervous system. A number of strategies are followed to target various body tissue/organs. The brain is a delicate organ with many vital functions, and formidable mechanisms isolate and protect it from the outside world. Unfortunately, the same mechanisms that prevent intrusive environmental chemicals accessing the brain also prevent the access of therapeutic chemicals (Soni *et al* 2004). The need for treatment options has been emphasized by the recent Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study, in which 74% of 1493 patients with schizophrenia discontinued study medication within 18 months. The reasons for discontinuation included lack of efficacy, intolerability, and patient decision. The CATIE study has increased awareness of the need for new treatment options tailored to the choice of the individual patient and clinician (Canuso *et al* 2008).

There is a need of a therapeutic prompt action to rapidly control agitation and disturbed behaviors in patients with schizophrenia, make Risperidone (RPD), a possible candidate for the development of an intranasal formulation. RPD, 3-[2-[4-(6-fluoro-1,2-benzisoxazol-3-yl)-1-piperidinyl] ethyl] - 6,7,8,9-tetrahydro-2-methyl-4*H*-pyrido[1,2-*a*]pyrimidin-4-one, is an approved antipsychotic drug belonging to the chemical class of benzisoxazole derivative and is available as tablet, oral liquid (Risperidal®) and orally disintegrating tablet (Risperidal® M-TAB) (DrugBank, DB00734).

Orally disintegrating tablet of RPD exhibit low bioavailability due to extensive first-pass