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/PROPRANOLOL / ELECTROSPUN

WINITA CHAIJAROENLUK : DEVELOPMENT OF MEMBRANE
CONTAINING PROPRANOLOL-SELECTIVE IMPRINTED POLYMER BEADS. THESIS
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The aim of this study was to synthesize the MIP beads capable of selective binding to propranolol (PPL) via oil in water (o/w) polymerization using methyl methacrylate (MMA) monomer and divinylbenzene (DVB) crosslinker. PPL was added during polymerization as an imprinted template molecule. Non molecularly imprinted polymer (NIP) beads were prepared by the same way as MIP except the addition of a template during polymerization which was used as a control in order to determine the selectivity of the resultant MIP beads. The selectivity for PPL of MIP beads or milled MIP beads incorporated with Eudragit fiber membranes prepared by electrospinning technique was investigated by comparing the binding ability to other β -blockers (atenolol, metoprolol and timolol). The morphology and particle size of MIP and NIP were investigated by scanning electron microscopic (SEM). The results revealed that particle size and percentage yield of NIP and MIP beads depended on amounts of DVB and PPL. Both MIP and NIP had a spherical shape with the micron-size about 50-100 μ m. Therefore, NIP2 (MMA:DVB; 75:2.5) and MIP8 (PPL:MMA:DVB; 0.8:75:2.5) were chosen for further characterization and binding experiments. The percentage reloading of PPL was increased by an increasing the ratio of PPL to polymer beads. Comparing the binding ability to other β -blockers, PPL showed the highest percentage reloading in MIP8 (> 80%). The reloading of other β -blockers in MIP8 was similar to NIP2, which was about 40-60%. 40% w/v Eudragit-RS100 in DMF/EtOH (33/67) was chosen for the preparation of fiber membrane containing 10-50% NIP2 or MIP8. PPL could be bound with higher extent and rate to the 50 % MIP8 composite Eudragit-RS100 fiber than NIP2 composite Eudragit-RS100 fiber. Moreover, PPL had higher affinity to the MIP8 than the other β -blockers. This result indicated that MIP8 composite Eudragit-RS100 fiber had higher selectivity to PPL than the other β -blockers. In conclusion, the PPL imprinted microspheres were successfully prepared and this MIP8 composite Eudragit-RS100 membrane can be further developed for various applications in pharmaceutical and other affinity separation fields.

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Student's signature

Thesis Advisors' signature 1..... 2..... 3.....

