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Food effects on gastrointestinal transit properties of Amphotericin B solid lipid nanoparticles

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Amphotericin B (AmB) is a polyene antifungal agent highly effective in treating life-threatening systemic fungal infections. We aimed to formulate AmB solid lipid nanoparticles (SLNs) meant for oral delivery and to study the effect of food on the absorption of AmB at the various regions of the gastrointestinal tract using an indirect approach. The indirect estimation utilises paracetamol (PAR) and sulphapyridine (SP) as marker drugs; the SP being a metabolic product of sulphasalazine (SSZ) from the activity of colonic flora. AmB, PAR and SSZ were similarly formulated into SLNs which showed identical physical properties (size, surface charge and morphology) and were simultaneously administered to fasted and fed rats whilst blood samples were withdrawn from their tails simultaneously for HPLC analysis. C_{max} was increased by almost twofold and AUC_{0-30} by more than twofold from AmB SLN compared with AmB suspension however T_{max} was increased (0.25 hr vs 4 hr). The presence of food delayed T_{max} and significantly ($p<0.05$) decreased C_{max} for the absorption of AmB from the AmB SLN although oral bioavailability (7953 ng.hr/mL vs 7565.33 ng.hr/mL) was not significantly reduced. The plasma concentration-time curves of PAR and SP were used in marking the approximate times at which AmB absorption occurred in the small intestines and colon respectively. The small intestines and the colon showed significant absorption of AmB SLN however, absorption in the colon was considered as partly due to slow drug release into blood from lymphatic drainage in the small intestines. The differences in the estimated percentage absorption of AmB SLNs in the stomach, small and large intestines for both the fasted and fed rats were not statistically significant. We may conclude that improved oral absorption of AmB was achieved following incorporation in SLN and food did not significantly affect the absorption of the AmB SLN from the gastrointestinal tract.

Biography

Nashiru Billa completed his PhD in 2000 in the field of pharmaceutical technology and since then has been a part of various institutions. He is currently a Professor with the School of Pharmacy, University of Nottingham, Malaysia Campus and is also the Associate Dean (Research) at the Faculty of Science. He has supervised over 15 PhD students and published over 30 journal articles.

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