Optimizing Drug Release From Encapsulated Pills for the Potential of Steadier Efficacy

Sandrapaty, Megha (School: Forest High School)

Researcher's acquaintance has ADHD and takes Adderall and shared that its effect (attention improvement) reaches a peak and drops quickly, resulting in having to time pill's intake with upcoming activities. Researcher wondered if there's a way to make the pills have steadier effect. Adderall capsules contain drug beads, some coated with Ethylcellulose (EC) that takes time to dissolve, with drug's release thereby delayed. Some drug beads are uncoated for immediate release. 50% are coated & 50% are uncoated, with mixture intended to create steady effect. Use of other ratios have not been reported for Adderall. Researcher devised in vitro experiment to test proof of concept using salt beads, some coated with EC and some uncoated and then introducing varying ratios, ranging from 0:100 to 100:0, into tank of PBS buffer with body similar pH 7.4. Elimination & replenishment of fluid was devised. Salinity checked hourly for 10 hours, to see which ratio of coated:uncoated beads resulted in flattest curve of concentration over time, by assessing squared deviations from the mean. It was found that coated:uncoated ratio of 60%:40% yielded flattest curve (most desirable), different from what's in commercial use. Also, for coating of beads in this optimal ratio group, a layer of EC coating that added 33% to weight of beads appeared sufficient. This was an in vitro study testing released concentration alone as implied measure of drug efficacy, drug metabolism was not evaluated, and process of elimination was an estimate. However, findings from this in vitro study raise interesting questions warranting further research regarding ideal ratio of coated: uncoated beads used in encapsulated pills and in vivo correlation.

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