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Magnetic Resonance Imaging to visualise disintegration of oral formulations

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Magnetic Resonance Imaging to visualise disintegration of oral formulations

Abstract:

This manuscript demonstrates magnetic resonance imaging (MRI) can visualise the disintegration of a variety of paracetamol containing oral formulations in an *in-vitro* setting and *in-vivo in the human stomach*. The different formulations had unique disintegration profiles which could be imaged both *in-vitro* and *in-vivo.* No special formulation approaches or other contrast agents were required. This data demonstrates the potential for further use of MRI to investigate and understand the disintegration behaviour of different formulation types *in-vivo*, and could potentially be used as a teaching tool in pharmaceutical and medical curricula.

Introduction

Within the gastrointestinal tract (GIT), the stomach and the small intestine each play a distinct role in the disintegration, dissolution and absorption of pharmaceuticals. The stomach has a relatively small surface area, with a secretory rather than absorptive function (1). In comparison, the small intestine has a high surface area (1), and is the primary site of drug absorption (2). For many oral formulations disintegration precedes dissolution and absorption. Some dosage formulations are designed to disintegrate rapidly in the stomach, whilst others use controlled release technologies, thereby allowing modified dosing regimens more appropriate for patients and disease states (3). Controlled release systems rely on a range of platforms from which drug is released through different mechanisms (3), therefore methods to evaluate behaviour need to be sought to further understand how these formulation designs interact with the GIT.