

Emma L. McConnell Abdul W. Basit

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KEY POINTS

- Modified-release drug delivery aims to deliver drugs at specific rates, times or physiological sites.
- Modified release can refer to extended, sustained, controlled, delayed or gastro-resistant release.
- Modified release can be employed to achieve once-daily dosing, to reduce side effects, to have long acting medicines or to target a site in the gastrointestinal tract, e.g. the colon.
- Extended release can be achieved by using matrix polymer tablets, polymer coated pellets or osmotic-based systems.
- Gastroretention is a type of extended release which aims to keep the drug in the upper gastrointestinal tract (stomach and upper small intestine).

- Gastro-resistant coatings (pH-controlled) protect a drug from the stomach and can be used for delivery to the small intestine or colon.
- Drugs can be targeted to the colon by using bacterial enzymes to initiate drug release.

Modified-release oral drug delivery

Administration of medicines by the oral route can seem like the most straightforward option for patients. It is the most commonly used route, with more than 70% of all medicines being delivered in this way. Oral medicines are easy to administer, improve patient compliance and are cheaper than some of the alternatives (e.g. injections). Most medicines administered by the oral route provide what is known as ‘immediate-release’ drug delivery or ‘conventional’ drug delivery. A common example would be the use of paracetamol (acetaminophen) for a headache; the tablet or capsule disintegrates quickly in the stomach fluids releasing the drug to provide rapid onset of effect, following absorption in the gastrointestinal tract. However, there are some situations in which this rapid onset is not desirable and a modification of the drug release pattern (or profile) is necessary to slow it down or make the drug’s effects last longer (e.g. for 24 hours). These more advanced oral drug delivery formulations are often referred to as oral modified-release (MR) drug delivery systems.

Modified-release drug delivery refers to the manipulation or modification of drug release from a