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Novel Drug Delivery: National and international landscape

EPSRC healthcare technologies grand challenges:

Need for OPTIMISING TREATMENT: right treatment at the right time

Need for DEVELOPING FUTURE THERAPIES: enhance efficacy, minimise costs and reduce risk to patients

At present patients often receive inadequate amount of medication because of the inability to refine the exact dose and optimise dose timing.

The excess is dangerous in terms of drug toxicity and side effects and wasteful in terms of the costs involved in the treatment of side effects.

Other issue is wastage through unused, or partially used, prescription medication (costs the NHS over £300 million every year nationally).

It has been reported that up to half of elderly patients do not take their drugs correctly.

Need for multifunctional solution – sense the need, deliver medication, report outcome.

Novel Drug Delivery: : Current Newcastle activities

Numerous SAgE & FMS activities:

- Materials for drug delivery
- Materials for sensing and drug delivery
- Materials (e.g. scaffolds) for tissue engineering and drug delivery
- Crossing barrier/s (e.g. in the brain)
- Regenerative medicine

Novel Drug Delivery: Future Research Opportunities

EPSRC

BBSRC

Innovative UK

Health KTN

Medicines Technology Catapult

Horizon2020

Novel Drug Delivery: Future Research Opportunities

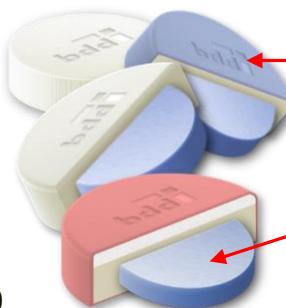
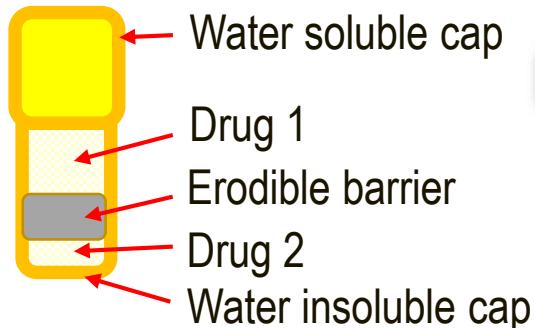
http://www.gla.ac.uk/media/media_459995_en.pdf

Chronopharmacotherapy

What is out there and what are the limitations?

Time controlled delivery systems

Pulsincap drug delivery system OralogiK™

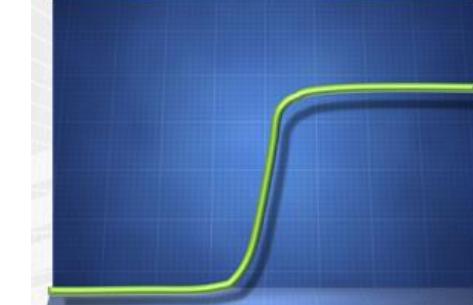


Membrane rupture

Barrier layer

Pulse or sustained
drug core

Drug core
Swellable layer
Outer rupturable coat

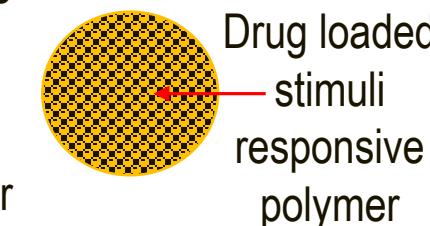
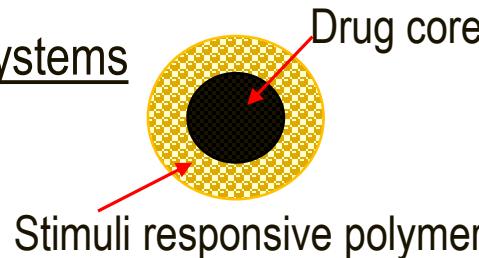


OralogiK™

Stimuli induced delivery systems

T pH Glucose

Inflammation

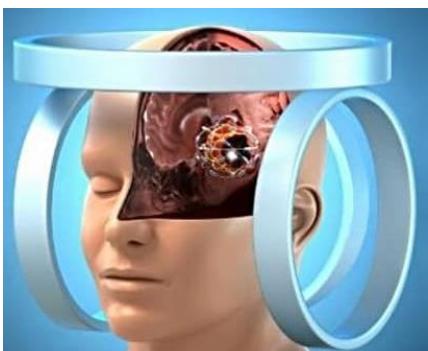


DELAY + PULSE
eg. zaleplon for sleep
maintenance



IR + DELAY + PULSE
eg. diclofenac for pain and
morning stiffness

Externally induced drug release



Magnetic

Ultrasound

Breaking News

Technology for hands
free rhythmic drug
delivery
does not exist!!!

www.gizmag.com bddpharma.com



DELAY + SR

eg. verapamil for circadian
cardiovascular event