# **Interview** with Andrew Owen, professor of pharmacology at the University of Liverpool.

## Q: How do long-acting injections work compared with pills?

A: Instead of giving the drug orally you inject it into the muscle or into the subcutaneous tissue between the skin and the muscle. The formulation then gradually releases the drug into the bloodstream over a period of between one and six months.

## Q: Can you tell us about the history of long-acting medicines?

A: The concept has been around for a long time. Surprisingly, the first publication about a long-acting injectable was back in 1953. Since the early 2000s there have been major advances for long-acting injectable contraception and treatments for schizophrenia. Just about ten years ago, in 2009, there were reports of long-acting injectable formulations for HIV, which is where the concept got introduced to infectious diseases in a big way. Our project aims to develop long-acting medicines for other infectious diseases that have a major burden in low- and middle-income countries.

## Q: Long-acting formulations are considered useful for fighting antimicrobial resistance. Why is that?

A: If you only sporadically take your medicine, then the concentrations in the blood dip very low in periods when you're not taking the pills. That gives a real chance to the pathogen—be it malarial parasite, tuberculosis mycobacteria or hepatitis C virus--to acquire drug-resistant mutations. And that can be detrimental to treatment and prevention strategies because then, even when a patient starts taking the medicine again, it won't work.

## Q: In some places, diseases such as HIV and tuberculosis carry a stigma that makes people hesitant to seek treatment. How can long-acting medicines help with that?

A: People don't always want others to be aware of their infection. Injections that last a long time are comparatively invisible (to daily pill regimens) in that regard, and in some cases this can also improve equity by reducing discrimination.

## Q: Do you think people will accept a change to the way they take medicine?

A: Patient attitude surveys in HIV clinical trials for long-acting injectables have revealed that this is exactly what patients wanted. Patients sometimes suffer from what we call "pill fatigue." The opportunity to switch to a once-a-month or once-every-two-months injection, patients found that very exciting. As part of LONGEVITY, the University of Nebraska Medical Center and Treatment Action Group will directly address the interests and attitudes of patients and providers for malaria, tuberculosis and HCV.

## Q: Where do you expect to be by the end of your project?

A: We hope to have the necessary clinical data to make an application to the FDA (US Food and Drug Administration) for approval of the medicines but there are lots of moving parts and we will need to work extremely closely with colleagues at Johns Hopkins University, the Clinton Health Access Initiative, the Medicines Patent Pool and Tandem Nano Ltd to tackle the development challenges head on. We won't have them in the clinic by the end of the project, but we do hope to be very close to having them approved. We will also establish a Centre of Excellence in Long-acting Therapeutics at the University of Liverpool so that broad understanding of technologies and how to use them best can be disseminated widely to global stakeholders.