Applied
Microbiology
International

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Under the Microscope Inquiry Submission

What area of science and technology do you think we should be looking at over the next Parliament? (Max 1300 characters)

The UK should develop flexible handheld and or portable devices made to international microbiological standards (ISO 17025 and Good Laboratory practice (GLP) standards). These tools should be tailored to detect microbial threats (such as pathogens and AMR patterns) unique to the UK. This would allow rapid detection and diagnosis at the point of human and animal care, food processing sites, farming environments, import sites for international foodstuffs, environmental sites enhancing public health and positively impacting the UK's GDP.

A few such devices do exist, but they are restricted in what organisms they detect and seemingly none detect genes involved in AMR. Moreover, current molecular methods, despite being favoured, generally have high costs and technical demands. This could be addressed by the loop-mediated isothermal amplification (LAMP) technology device used in waterside locations.

Microbiologists, environmental health officers, and vets would benefit from soil-, water- and animal-side handheld devices to test for soil-associated food chain pathogens (e.g. E. coli, Salmonella) to monitor their entry into the food chain & persistence within it to the point of presence in kitchens.

Why does it matter to you? (Max 1300 characters)

Food epidemiology teams encounter pathogens in very varied farm environments, animals (e.g. cattle, dogs, birds), food processing plants, supermarket cold cabinets, domestic and industrial kitchens. In human health a wide range of infections are complicated by a lack of diagnostic results and AMR detection. Moreover, contrary to National Institute for Health and Care Excellence (NICE) guidelines, clinicians, including dentists and GP's, often prescribe antibiotics without involving microbiologists.

What all these varied landscapes have in common is that international microbiological standards e.g. ISO17025 and GLP must be adhered too. Culture and sensitivity methods were the gold standard and still are. However, these classic methods can be frustratingly slow, cannot easily detect damaged or dormant cells, slow down food chain product release and effective culture and sensitivity for infections, ultimately impacting health, cost-effectiveness and GDP. When working in non-Western analytical labs a lack of the above standards is often observed. These labs, and so international epidemiology, would benefit from such rapid cost-effective point of care analyses, meaning the UK could reap diplomatic gains as well.

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What do you think Government should do about it? (Max 1300 characters)

Handheld (or portable devices) that can detect genes associated with AMR are desirable. The lauded AMR report by Lord O'Neill concluded that if we don't undertake major initiatives, by 2050 there could be ~10 million people globally dying from AMR-related illnesses. It was projected that worldwide, the lost economic potential here between 2015 and 2050 could be ~$100 trillion. In the related report, Rapid Diagnostics: Stopping Unnecessary Use of Antibiotics, it was stated it is cheaper and quicker for individuals to go straight to using an antibiotic without checking via a diagnostic test (especially in emergencies). The Rapid Diagnostics report stated, “Governments of the richest countries should mandate now that, by 2020, all antibiotic prescriptions will need to be informed by up-to-date surveillance and a rapid diagnostic (and sensitivity) test, wherever one exists.” Have we as a community achieved this? Clearly not. By developing handheld devices capable of detecting AMR genes, the UK could lead the way in AMR detection and surveillance reaping national and international gains.