

Chemistry for Tomorrow's World

Diagnostics



Recognising disease symptoms and understanding how a disease develops is vital for effective treatment. Globally there are 33.2 million people living with HIV, but only 10% are aware that they are infected, resulting in the uncontrolled spread of the virus throughout developing nations. This, along with tuberculosis and malaria, places a huge burden on under-equipped health systems.¹ Several common forms of cancer can be treated successfully if detected early enough, but diagnosis is often made at a later stage.²

Developing an effective healthcare system is a challenge for all nations, but technological advances combined with the greater understanding of disease progression can develop simple low cost diagnostic solutions.

How can the chemical sciences help?

- The chemical sciences will be essential in advancing earlier diagnosis and improved methods of monitoring disease to improve and save human lives.
- There is scope to develop more non-invasive techniques to allow diseases to be detected without invasive and often traumatic investigatory procedures.
- Using analytical chemistry, low-cost, point-of-care diagnostic techniques can be developed to help reduce waiting times for what is currently specialised equipment; this would make regular health checks available to a larger population.
- Through collaboration between the biological and chemical sciences, developments can be made so that subtle changes in the body can be used to diagnose diseases before symptoms are even displayed.
- By understanding the chemistry of disease onset and progression, chemical scientists will be able to tailor drug treatments so they are effective at interacting with the illnesses at different stages of development.
- Diseases progress differently in different people. As chemists develop the ability to map an individual's genetic make-up, it will be possible to investigate tailored treatments that are specific to that individual's need.
- Through research and development by chemists it will be possible to create advanced combined diagnostic and therapeutic devices; these are smart, responsive devices that can first detect infection and then respond with treatment to the attack.

About the RSC & Chemistry for Tomorrow's World

The Royal Society of Chemistry (RSC) is the leading society and professional body for chemical scientists. Over 2008 and 2009, it gathered expert views to identify priority areas where the chemical sciences can play an important role in the development of society.

For more on this initiative please visit our website:

www.rsc.org/roadmap, contact us at **roadmap@rsc.org** or call the RSC science team on +44 (0)1223 432424.

1 The Maputo declaration on strengthening of laboratory systems, World Health Organisation, 2008
2 Cancer Research UK (CRUK) www.cancerresearchuk.org, 2008 (valid 27 January 2008)