A sense of community

Many companies promote science to the public, as well as their products. Ian Davidson describes the educational activities of Unipath for 16+ students.

Unipath is an operating company within the Unilever Corporation. Founded in 1984, the company has developed and launched a number of products based on patented immunochromatographic technology.

In the area of microbiology, Unipath developed and launched the world's first, rapid test for the detection of *Chlamydia*. Other tests include those for the detection of *Clostridium difficile* toxin A, *Listeria* and *Streptococcus* A."

Over the past 3–4 years Unipath has hosted a number of visits from 6th form students from local schools. Groups of 12–16 students come for a day and are given a couple of presentations, one with a biological/chemical bias and the second with a measurement science bias.

The first starts with a question: '*How would you make a pregnancy test that a lady can use in the privacy of her own home, does not require any equipment and can be used on or around the day of the missed period?*' From there we explore antibodies, specificity, sensitivity, materials used within immunoassays and the process required to move from lab scale to mass production. The thread we try to weave through this presentation is that delivery of a product requires input from many scientific disciplines.

The second presentation starts with the 'signal', the results of a single pregnancy test. We develop this into the area of quantitation, covering sensitivity, precision, different labels and therefore different measuring systems, again trying to emphasize the multidisciplinary approach required: in this case using chemistry, optics, electronics and industrial design.

After sitting for a couple of hours the students get to stretch their legs with a tour of the R&D labs seeing (perhaps) more sophisticated equipment than they are used to with scientific staff at hand to give a few minutes on, say, IR or HPLC.

Lunch follows, definitely the highlight of the day: 16- and 17-year-olds seem to be nothing but highly developed eating machines. I'm pleased we only provide one meal, otherwise the programme would soon be bankrupt!

The afternoon provides an opportunity to see the preparation of reagents at scale, equipment used to carry out controlled procedures and the assembly of pregnancy test sticks.

The day hopefully provides an overview of development of a concept, optimization of the concept and transfer of these optimized procedures into a manufacturing environment.

We ask for feedback from the students to refine the day and below are a few reactions.

'*The trip to Unipath enabled me to see how the industrial processes behind the chemical industry are performed. It emphasized the importance of the research and development stage and also the co-operation and co-ordination between different chemical companies when designing new products*.'

'*The visit to Unipath was very interesting, and it was good to see the chemistry that I have learnt being used on a large scale*.'

'*The trip was not very useful all the way through as some parts did not link into our course. However, some parts were very useful and interesting, for example, visiting the labs and also speaking to the workers on a one to one basis was very interesting*.'

'*I really enjoyed one day, it was very useful to me. It helped me to reinforce my plan of continuing a career of research and development. The atmosphere of the labs and building was very encouraging. It helped me to see the end product of a chemistry 'A' level*.'

'*I never realised the size and number of people that it took to produce, research, etc. The tour brought home to me how busy and how much work was involved in producing things. I also saw jobs I never knew existed. I saw how the development of an idea occurred and the number of processes and standards they had to reach. I learnt a lot about the industrial process, especially about R&D which I was very interested in. I had a very enjoyable day and took away a wealth of knowledge about how the chemical industry functions and possible ideas for my future in it*.'

RIGHT:
Examples of detection kits produced by Unipath.
PHOTOS COURTESY UNIPATH

The following quotation is taken from a Unilever publication *A Sense of Community* (hence my title):

> '*The crucial importance of education to the future well-being of the UK and its people has been stressed repeatedly both by Government and community organizations. So it is hardly surprising that education has been a core priority within Unilever's community programme for many years. As a major company, it is in our long-term interest that the UK has a modern, successful and inclusive education system – an attribute which is essential for economic success and social cohesion.*
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> *In pursuit of this goal, we actively support education projects in selected focus areas, both by making cash donations and sharing our internal resources. Of course, the most important of these resources is the time, skill and enthusiasm of our people. Unilever Group companies have established links with around 200 schools and colleges – and in 1998 alone, our total contribution to education was £1·7 million.*
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> *Unilever companies and individual sites respond to their own local schools' needs. At the same time, they can all contribute to our nationwide programmes, as Unilever takes advantage of its decentralized infrastructure to deliver national projects on a local basis.*
>
> *Whether they are run centrally or locally, all Unilever's educational programmes are created in partnership with respected specialist education organizations. Some of these bodies are involved directly in the management of Unilever programmes. Others receive funding for their own projects, which complement our focus areas. In either case, the key to success is our shared vision, pursued through partnership and co-operation.*'

Unipath's involvement with 6th forms is an example of conversion of a corporate vision into a grass-roots initiative. For me and for others from Unipath who get involved in these days it is fun and rewarding.

Teachers we are not! Having just joined the Education Committee of the SGM, I would be pleased to hear from industrial institutions about their experiences interfacing with schools in their local community, or advice from academic institutions on '*getting the message over*'.

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National Science Week 2000

Willie Wilson

■ Explaining marine virus ecology to the public

'Viruses are the most abundant biological agents in the ocean; consequently, they affect global biogeochemistry, nutrient flow in the marine microbial loop…'

…AAAAAAAGH

Wait a minute, its children I'm meant to be explaining this to, *NOT* scientists. And there lay the challenge. National Science Week (NSW), formerly SET week, was fast approaching. My task was to explain the importance of viruses in the ocean and how we use molecular tools to detect them. We also had to make an interactive display. All part of the Marine Biological Association (MBA)'s NSW effort this March to promote science to the public at the National Marine Aquarium in Plymouth.

I approached the SGM for ideas and they provided some posters to augment our display, made a few suggestions on how to explain PCR and asked us to report how the event went. However, it was back to the drawing board for a brainstorming session with my team (Emma Hambly, Matt Hall and a visitor to the MBA, Susie Wharam). Our central theme was oceanic microbiology/virology. Essentially I wanted to get across the following points: viruses are extremely numerous in seawater (over one million per ml); they are very small (i.e. smaller than bacteria); they are not bacteria (sorry SGM audience, but you know what the media are like!); molecular probing is used to detect them; and they can influence the weather (viral lysis of phytoplankton causes a flux of dimethylsulphide (DMS) into the atmosphere which is oxidized into acidic cloud condensation nuclei).

Emma helped with the first couple of points by producing a poster illustrating the relative abundance of each food-web component in the ocean: '*There are a few sharks, some fish, lots of small fish, hundreds of zooplankton* (the adjacent display showed live footage of zooplankton, so we didn't need to explain what they were), *thousands of phytoplankton, millions of bacteria and billions of viruses*'. Emma also constructed a cardboard electron microscope complete with binocular vision of a range of electron microscope images of viruses – good old *Blue Peter*! We also had a 'normal' microscope containing thin sections of phytoplankton to illustrate that viruses are too small to be seen by light microscopy.

Molecular probing wasn't quite so easy but Susie produced a 'seawater sample' bucket, containing polystyrene beads as our seawater, and 30 'morphologically identical' cardboard viruses hidden in the sample. Some of the viruses had either a metal washer or a piece of velcro attached. Our 'probes' were coloured sticks: a red probe carrying a magnet and a blue probe with some velcro hooks. The children loved delving in the seawater to find our viruses and testing them with our probes. The red (magnetic) probe attached to some of the viruses and when the children opened them up, most seemed genuinely amazed when they found a piece of red DNA (a piece of ribbon) inside. Blue DNA was found inside the viruses located by the blue (velcro) probe. However, neither probe could detect the viruses containing green DNA that was found inside the third 'genotype'. The reason for this, of course, was that we are still developing the probes back at the laboratory!

The whole process was helped along by a giant model of a phage, constructed by Matt, complete with a contractile tail with DNA spiralling out after contraction. This helped to explain the process of phage infection. Although some of the smallest children didn't understand the principles of gene probing, they certainly enjoyed themselves and many accompanying Mums and Dads learnt a lot – a truly interactive success.

The backdrop to the display contained posters explaining the importance of viruses in the sea and their role in sulphur cycling, and hence climate, through the production of DMS. I also showed a BBC video *Beyond the Naked Eye*. It contained an excellent 30-second animation of a virus infection cycle and footage of bacterial lysis (with some unusual Christmas cracker sound effects!) amongst some other brilliant footage of various microbial processes.

Our effort was part of a larger display by the MBA under the general theme *Sea Food Special*. Other areas covered were cephalopod camouflage, filter feeders, limpets 'scraping a living', the plankton and aquatic photosynthesis. The whole event was a resounding success with about 1,000 people passing through the doors over the 3-day period.

● *Dr Willie Wilson is an MBA Research Fellow investigating the molecular ecology of viruses in aquatic environments (email whw@mba.ac.uk). Further details of the MBA can be found on their web site (http://www1.npm.ac.uk/mba).*