



## Editorial

### Old staining methods: Dyeing a slow death

In 1856, the English chemist William Perkins' attempts to synthesize quinine turned up instead, a strong aniline dye. Over the next several decades, particularly in Germany, Perkins' purple dye provided a mordant-like impetus for the synthesis of hundreds of dyes: Alizarin Red, Congo Red, Phenolphthalein and the Rhodamines.

In 1884, two years after Robert Koch had first sighted the Tubercle bacilli, Hans Christian Gram of Denmark reported that he had visualized the cocci of pneumonia with the help of a complex method of staining that he with his colleague Karl Friedlander had devised—the method that today bears his name. Until the advent of the 'Grams' stain', bacteriology as a science was not yet established—for a patently obvious reason: without effective stains, bacteria were not easy to see, much less classify.

Tubercle bacilli because of their astonishingly complex cell walls—indeed, the most complex cell walls in *all* of nature—effectively kept out all known conventional stains, and were therefore extremely difficult to visualize. Robert Koch finally read that riddle in 1882, when in a lab heavy with ammonia fumes, he managed to finally penetrate the waxy bastion of the Mycobacteria. Koch's inno-

vative staining methods were later refined by Franz Ziehl and Friedrich Neelsen—who now lend their initials ('Z-N') to the most commonly used stain in Mycobacteriology.

The Grams' and the Z-N stains have endured 130 years of frenetic technological advancement, and still survive as fundamental staining procedures in microbiology labs—not least because of their simplicity and cost-effectiveness. In spite of their great dependability however, these techniques are not infallible. For instance, a number of factors during the decolourization step of the Grams' stain make it liable to under-reading. Some Gram-positive rods like the Bacillus species can stain Gram variable or Gram negative. Breaks in the cell wall that bacteria in older cultures can develop, also give Gram-variable results. The Gram's stain is also prone to operator-error.

In a day and age of burgeoning medical technology, these age old staining methods stand out as somewhat primitive and cumbersome. Reliable alternatives to complement older staining techniques are needed, today more than ever.

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