

# Rosalind Franklin, Nicole Kidman and *Photograph 51*

I must admit that when I first heard that Nicole Kidman, winner of the Best Actress Oscar for her portrayal of Virginia Woolf in *The Hours*, was to take the role of the pioneering structural biologist Rosalind Franklin in a West End play, I was slightly sceptical. However accustomed to portraying brilliant minds, a blonde Australian seemed to be an odd choice for an upper-middle-class Englishwoman who was culturally, if not religiously, very much a Jew. But I couldn't resist the idea of a play about one of the most crucial moments in the history of molecular biology. I was lucky enough to acquire tickets for Anna Ziegler's *Photograph 51* at the Noel Coward Theatre, and I was not disappointed. The play was compelling.

*Photograph 51* is no conventional 'biopic'; instead, it focuses on the key period in Franklin's life, the three years she spent at King's College in London working on X-ray photographs of DNA, and the momentous discovery of the now iconic double-helix structure. It has a tiny cast, with Kidman's Franklin – a dark slender figure in a 1950s pinafore dress, with a clipped English accent – the linchpin. Around her circle the five men who were principally involved in her 'life in discovery'. Besides Watson and Crick, these were her colleague at King's, Maurice Wilkins, the New Zealander who shared the 1962 Nobel Prize in Physiology or Medicine with Watson and Crick; Ray Gosling, the PhD student assigned to work with her; and a postdoctoral colleague from Canada, Don Caspar, who became a close friend.

The set design was sparse but effective. The centre of the stage was almost bare, most often conveying Franklin's laboratory at King's with just a single lab bench. It was surrounded by 'semi-destroyed' brick arches, representing both the college and London itself only a few years after the end of World War II. However, the message conveyed by the design of the set floor was completely different. Its white Perspex tiles were under-lit in a pattern that changed with the action. Set designer Christopher Oram has suggested that this resembles the photographic light boxes that molecular biologists use when examining PCR plates. It therefore hints at the new era of biology that the discovery of the DNA structure made possible.

To me, the arches around the set were also reminiscent of cloisters, and this image underlined one of the key themes of the play: the conservative male-dominated atmosphere at King's and Franklin's difficulties as a woman scientist

in establishing her career there. This and her strained relationship with Wilkins have been well documented in her biographies. Very early in the play, when Franklin had just arrived in London, we see Wilkins informing her that she could not accompany him to the college dining room because that was for male academics only. This seems outrageous today, but it was a matter of course only two generations ago. Franklin's angry response showed both deeply held passion and control. Throughout the play, her polite and understated feminism and (it has to be said) her reserved and somewhat prickly character bring her into conflict with her male counterparts time after time.

Franklin's greatest strengths as a scientist were in her experimental work. She was skilful and meticulous, and the X-ray photographs of DNA that she and Gosling produced at King's were the clearest in the world at that time. Just to start with, they enabled them to discover that DNA can crystallize in two forms (named A and B) depending on its hydration. The eponymous 'Photograph 51' was the clearest of the B-form of DNA, showing the X-shaped diffraction pattern characteristic of a double helix. J.D. Bernal, head of the newly established Biomolecular Research Laboratory at Birkbeck College in London (and who was not mentioned in the play despite his importance in Franklin's later career) described it as 'the most beautiful X-ray photograph of any substance ever taken'. One of the most dramatic moments of the play captures Franklin and Gosling's delight in that photograph, although it is unclear whether they understand exactly what it implies. The rest, however, is history. Unknown to Franklin, Wilkins shows the photograph to Watson and Crick, visiting from Cambridge, and it gives them the final clue to DNA's double-helix structure.

In March 1953 – the same month as *Nature's* publication of the DNA structure papers – Franklin moved to Bernal's laboratory at Birkbeck to work on the structure of the tobacco mosaic virus. Her time there was productive, but tragically short; she died of ovarian cancer four years later at the age of 37. Her last illness, and her growing friendship with Caspar who she once said she "might have loved, might have married" are given a single moving scene at the end of the play. Caspar is shown as inviting her to dinner, where she collapses and is apparently taken to hospital.

The play does have a few flaws. It is short on action, relying largely on dialogue for dramatic effect – I found myself wondering how it would work on radio.

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And, particularly placed alongside Kidman's stunning portrayal, the male characters lacked clarity. In particular, James Watson was played as a tousle-headed overgrown schoolboy who seemed a most unlikely future Nobel Laureate. The two who had, in real life, been most sympathetic to Franklin's point of view – Caspar and her student Gosling – were the most realistically played. There were times when each of those two seemed to step outside the action to provide a commentary.

Writing in the *New York Times*, critic Ben Brantley described Kidman's performance as "close to perfection". I would tend to agree, and, although this cannot quite be said of the play as a whole, it is inspiring. Women in science have come a long way since the 1950s, but we still have some way to go. I hope that *Photograph 51* inspires biochemists of both sexes to keep on working for full equality. ■



Joshua Silver (Ray Gosling) and Nicole Kidman in *Photograph 51* (Photo © Johan Persson)

## Best of the Web

# Playing the Education Game

Helen Albert (Editor)

In this issue the benefits of using onscreen bioscience to engage students have been discussed at length. Gamification, or the use of game design theory for non-game applications, is another method that has been adopted with enthusiasm in the education arena. Three up-and-coming games or apps that help children to learn about molecular biology are highlighted below.

November saw the release of the Bacteria Combat app by University of Glasgow PhD student Carla Brown, whose research focuses on the development of species-specific antibiotics (bacteriocins).

The app project, part-funded by a Biochemical Society Scientific Outreach Grant, began life as a Top Trumps style card game designed to help educate children about antibiotics and how they should be used.

While it was popular, feedback suggested it would work better as an app, so this is what Brown developed with Future Fossil Studios. The first version of the game, Bacteria Combat Lite, is free to download on Google Play and the App store. A multiplayer version of the game is under development.

Earlier this year, chemistry students at the University of Hull created a freely downloadable game called MolCraft, an adaptation of the popular computer game Minecraft, to allow children to learn about biochemistry.

Using the basic block-building principle of Minecraft, MolCraft swaps bricks for protein chains. It allows players

to explore and read information about the molecules and to find a range of virtual goodies including puzzles and quiz books.

Another recent success is the app DNA Play, which allows children to learn about genetics in a fun and engaging way by challenging them to complete DNA puzzles in order to build monsters. The monsters, which are more of the cute-and-cuddly than scary kind, can then be further adapted by triggering 'mutations' via judicious tapping of body parts.

DNA Play is available for smartphones and tablets on both Google Play and the App Store. It was nominated by The Guardian as one of its 'apps of the month' for November. ■

