nature
cell biology

The rewards of a life of commitment to science

One of biggest spurs for many biological scientists is the idea that their work might benefit the human race. Trudy Elion showed that, with the right focus and determination, this ambition can be realized.

Autumn, the traditional time for job searches by those seeking to secure an academic position, is, needless to say, a period fraught with anxiety and self-doubt. It is also often a time for taking stock of past accomomplishments and making realistic assessments of future goals. What better time, therefore, to remind ourselves of what can be achieved, not in the quest for outward stamps of approval and advancement, but merely by a passion for science and a single-minded purpose to improve the human condition.

Surpassing initial barriers

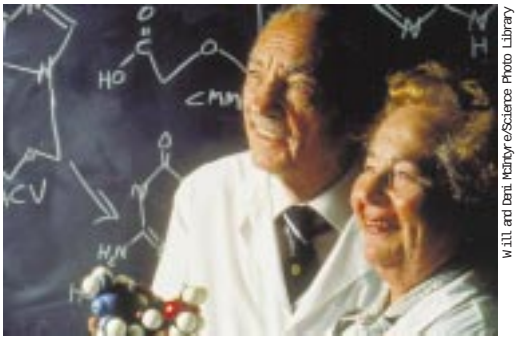
Gertrude 'Trudy' Elion was born in New York City during the first World War to immigrant parents from Lithuania and Russia. She showed an affinity for science from an early age, graduating from high school at the relatively young age of 15. She received the highest academic honours upon her graduation from Hunter College four years later with a degree in chemistry. After two more years of study, she was granted a master's degree from New York University. In the contemporary climate, however, an academic position for women in science, even one of her obvious talent, was virtually unconscionable, and her applications to several doctoral programmes went unanswered. She would later state that women were not wanted in laboratories because they would cause a 'distraction'. Consequently, she used her skills in a more socially acceptable way, teaching physical sciences to high-school students.

Things were soon to change, however. As the entry of the United States into World War II literally drained laboratories of their manpower, women of many backgrounds were presented with new opportunities. One of these was grabbed by the young analytical chemist. After brief sojourns into quality-control testing of food products and basic research for Johnson and Johnson, Elion was hired in 1944 by Burroughs Wellcome, a pharmaceutical company based in New York, and joined the laboratory of the biochemist George Hitchings. Now, finally, she was involved in the pursuit to cure cancer (her goal from a young age, having seen two relatives succumb to the disease).

A partnership flourishes

The collaboration between Elion and Hitchings was to be long-lived and unbelievably productive, and many areas of medicine would be profoundly changed by it. They sought to

identify the underlying mechanisms of disease so that they could then develop compounds, through a process of trial and error, that would attack the Achilles' heel of the disease. This approach led them into the area of nucleic-acid metabolism, and it is remarkable to think that these studies were initiated at a time when the structure and mode of replication of DNA had yet to be determined. Throughout their partnership, Elion and Hitchings developed compounds — mainly modified base analogues — to treat bacterial and viral infections, gout, malaria, rheumatoid arthritis and leukaemia, and to prevent the rejection of transplanted organs. AZT, which has entered our common consciousness as one of the early effective therapies against AIDS, emerged as an antiviral treatment from their research.



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1988 Nobel Laureates: Gertrude Elion and George Hitchings

Over the years, their partnership remained on a firm basis, despite the relocation of Burroughs Wellcome to North Carolina and its purchase by the even larger British pharmaceutical concern, Glaxo. In 1967, Elion was made head of the Department of Experimental Therapy, and she presided over its several-fold expansion over the next 16 years. Although she officially retired in 1983, Elion maintained her office on site and continued to be involved in teaching and councelling students from the local medical school. She also served the World Health Organization as an ambassador for the advancement of science. In 1988, Elion and Hitchings (together with Sir James Black, who pioneered the use of beta blockers to treat heart disease) were awarded the Nobel prize in Physiology or Medicine for their contributions to drug development. To honour their achievement, the Burroughs Wellcome Fund in collaboration with the Wellcome Trust and National Institutes of Health established the Hitchings–Elion postdoctoral fellowships in 1992 and to date they have supported 56 young scientists. Other major awards, 45 patents and 25 honorary doctorates attest to the success Elion shared with Hitchings in their 40 years of combined effort — always with the goal of alleviating human suffering. Nevertheless, both Elion and Hitchings were noted for their modesty and down-to-earth demeanour.

The scientific life

Although Elion never married (her fiancé died of bacterial endocarditis), she did not lead an isolated life but surrounded herself with a vast network of relationships, including her extended family, co-workers, and scientists around the world. When she died in 1999, Trudy Elion had achieved recognition far beyond what she might have imagined as a young scientist unable to secure a research position. But more importantly, she left behind an example of the impact that one person's commitment to science can have, not just within their own particular field, but on a global scale. In the eyes of the world she might have made many sacrifices, although Elion would herself assert that she was more than repaid by the improvements to the health and happiness of mankind to which she contributed a small part. As she said, "It is the most rewarding form of life there is."

Of course, this is only one example among many of scientists who have devoted themselves to the pursuit of knowledge for its own sake and for the benefit of mankind. That is not to say that such a focused career path should be pursued by all scientists. But although we might sometimes be daunted by the challenges of pursuing our own scientific careers, we should be inspired by examples such as that provided by Gertrude Elion, which reaffirm the unique nature of science as a profession and show us that with initiative and force of character, many obstacles can be surmounted.