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A two-year walk with David Hopwood

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The dramatic advances made on *Streptomyces* over the last 40 years are indissolubly linked to the figure of Sir David Hopwood and to the John Innes Centre. A privileged witness of this period and a close colleague of Hopwood, Keith Chater outlines in the accompanying article [6] certain moments of Hopwood's scientific career, which were particularly fruitful from the scientific point of view. I am honored for having had the privilege of sharing with him not only bench and flasks but also, in particular, two unforgettable years of my life.

I arrived to Hopwood's lab one morning in September of 1979, with an EMBO fellowship in my pocket and a Ph.D. on the biochemistry and mechanism of action of a group of antibiotics named microcins, discovered by Carlos Asensio a few years earlier [3].

During my Ph.D. I was impressed by the pioneer work of Hopwood on the genetic analysis of antibiotic production [9], which later on was crucial in the industrial improvement of antibiotic production. In those early years of the development of molecular biology, I was captivated by a paper of Hopwood's group showing that both antibiotic production and resistance were coded by a plasmid [8]. Studies on microcins led by the group of Fernando Baquero seemed to also be the case [4].

Suddenly, it all became clear to me: in my postdoc I decided to tackle the antibiotic methylenomycin, whose production and resistance genes were coded by a plasmid (SCP1) from *Streptomyces coelicolor* A3(2). Physical isolation of the plasmid was essential for more refined studies. Unfortunately, the SCP1 plasmid proved impossible to isolate by conventional procedures [11]. In spite of the many different methods and approaches suggested by my colleagues at the John Innes Centre, I still had no luck in isolating the elusive SCP1. In those days Hopwood and I came across an article of Okanishi et al. [10] in which they had detected, by electron microscopy only, a plasmid (pSV1) in the original methylenomycin-producing *Streptomyces violaceus-ruber* strain. The next series of questions were obvious: Could pSV1 be related to SCP1 and also code for methylenomycin production and resistance? Could pSV1 be isolable? The answers to both these questions were, in fact, positive. Plasmid pSV1 was isolated and its size was estimated to be about 110 MDa. At the same time we demonstrated that it coded for either methylenomycin production or resistance genes [1, 2]. As Chater indicates in his article, the mystery of the SCP1 plasmid needed another ten more years to be clarified [7], but this is already another story.

I have the privilege of having been the first of a long list of Spanish postdocs who worked with Hopwood. I think that one of the reasons for attracting so many people to his laboratory was his rare ability to combine scientific and human excellence. From him I learned all that I know about *Streptomyces* plus a continuous lesson of humbleness. Hopwood had a broad and restless mind; he was always interested in other cultures, in any aspect of science and art, in Chinese food, in wine and in music, particularly the guitar. I shall never forget the evening of the 25th of February 1981, when the Hopwoods (Joyce and David) invited my wife Rosario and myself to a concert of Spanish guitar in the Strangers Hall to celebrate the failure of the military putsch in Spain two days before. Luckily, I did not need to make use of his generosity to remain in the UK, should the putsch have succeeded.

Not many people know that David Hopwood has also played an essential role in the promotion of Biotechnology in the European Community. In fact, he was invited by the European Commission (EC) to provide advice for the preparation of the first research and training European programme in Biotechnology, the Biomolecular Engineering Programme (BEP) of the European Community that existed from 1982 to 1986. Although it is now past history, its decisive contribution to the "Europeanization" of research has made this pioneering activity an outstanding landmark for any observer of EC biotechnology [5]. The recognition of the European dimension of the *Streptomyces* research was also due to Hopwood. Thanks to the recommendations stemming from a seminal meeting chaired by Hopwood in Brussels in 1987, Community R&D benefits from outstanding collaborative R&D projects on the biotechnology of *Streptomyces*.

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