

### Letter to the editor\*

In his paper “The post-Loeffler era: contribution of German virologists” (in: “100 Years of Virology,” C. H. Calisher and M. C. Horzinek, eds., Arch. Virol. Suppl. 15, p. 43–61, 1999), R. Rott states: “Certainly, one of the most remarkable discoveries in plant virology in the post-Schramm era was the simultaneous and independent finding by Theodor O. Diener in the USA and Heinz L. Sänger in Giessen of ‘naked’ small RNA molecules as a new kind of autonomously replicating subviral plant pathogens known today as viroids.”

This statement is demonstrably wrong. In a paper published in August 1971 (Virology 45: 411–428), I presented conclusive evidence that the agent of the potato spindle tuber disease (now known as PSTVd) possesses unique properties that distinguish it from all viruses, thus representing the prototype of a novel class of pathogen, for which I proposed the term viroid.

Sänger, after having heard my presentation at the 1971 International Congress for Virology and being cognizant of my 1971 Virology paper (op. cit.), simply applied the methodology developed for PSTVd to another plant pathogen, the agent of the citrus exocortis disease (then known as ExC).

That Sänger himself agrees with this chronology is evident from statements he made in his very first (albeit unreviewed) publication on viroids (H. L. Sänger, Adv. Biosc. 8: 103–116, 1972): “Therefore, I conclude that ExC is the second member of the new class of minute infectious agents for which the term ‘viroids’ has been proposed [8].” And: “The agent of the spindle tuber disease of potato (PSTV) was the first viroid discovered ...” Ref. [8] is my 1971 Virology paper cited above.

In conclusion, Sänger deserves credit for confirming the viroid concept with a second plant pathogen, but certainly not, as Rott claims, for “simultaneously and independently” discovering the viroid.

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\* Editor’s note: Following a suggestion by Prof. M. C. Horzinek, co-editor of “100 Years of Virology” (together with Prof. C. H. Calisher), the following discussion between Prof. Diener and Prof. Rott is published here to make it accessible to a wider audience.

### Author's reply

First of all, let me thank Prof. Calisher for giving me the opportunity to respond to the letter sent to you by Dr. Diener regarding my article published in Archives of Virology (1999) [Suppl.] 15: 43–61 (“100 Years of Virology”).

The subject matter of my article described the contributions made by German virologists in the post-Loeffler-Frosch era. For this very reason, therefore, it was only in a few exceptional cases that I cited research results stemming from non-German institutions. One of the aforementioned exceptions was the work carried out by Dr. Diener whose admirable contributions to viroid research I particularly wished to highlight in this way.

Since one cannot do justice to everyone in such an article, I pointed out in its introduction that “my selection and evaluation will appear to be subjective. In doing so, I may offend certain individuals and would therefore like to apologise in advance”. Despite this however, I very much regret that Dr. Diener obviously feels offended by my article and would thus like to reiterate my earlier apology.

If one considers the publication date alone as being the sole criterion for a “new” discovery, then Dr. Diener is most certainly correct in insisting that he was the forerunner in the discovery of subviral pathogens which today, according to his proposal, are known as “viroids”. Nevertheless, when I wrote in my article that Dr. Diener and Dr. Sänger had simultaneously and independently of each other found “naked small RNA molecules as a new kind of autonomously replicating subviral plant pathogen”, I did this based on my rather detailed knowledge of Dr. Sänger's work. He and I were in very close contact during the period from 1964 until his move from Giessen to Martinsried in 1980. We often met more than once a week and thus regularly had many lengthy discussions about our scientific work. As a consequence I know that Dr. Sänger had essentially obtained the same results with the citrus exocortis agent as those published by Dr. Diener in 1971 on PSTV. It is therefore unjustified to state that he “simply applied” Dr. Diener's methodology. Moreover, as I am sure Dr. Diener will recall, in the discussion following his presentation at the International Congress of Virology in Budapest in 1971 Dr. Sänger pointed out this fact and thereby confirmed the results presented by Dr. Diener.

With my article and its short description of viroid research in Germany I did not intend to evoke a dispute about priorities. If indeed, that were the case then I would have also had to mention Dr. Singh and Dr. Semancik. Dr. Diener is certainly aware of the fact that both of these researchers had also at that time obtained results comparable to his own which however, like Dr. Sängers', were published somewhat later. From their publications one can clearly deduce that they must have obtained their data around the same time as Dr. Diener and also independently of him.

I regard Dr. Diener as an exceptional and innovative scientist. I would very much regret if our future relationship were harmed by my article.

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