Chapter 13. Remarkable… but disappointing results

Back to the Cochin institute

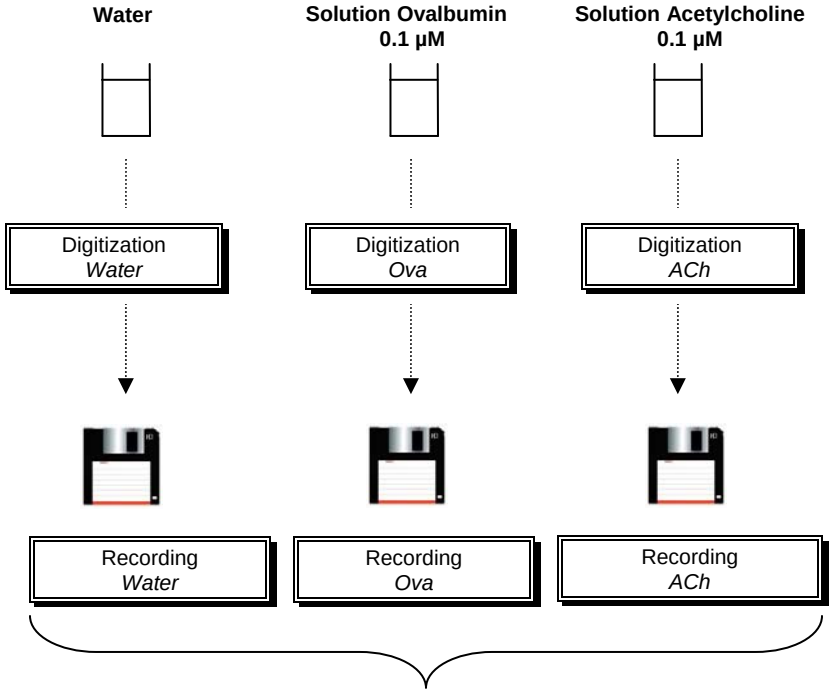
After this “progress” obtained with digitization, the year 1996 was very rich in experiments and public demonstrations. On this occasion, J. Benveniste, in his quest of the “crucial experiment”, renewed the “Cochin experiments”. He indeed considered that these experiments were of great strategic importance because they were made outside the laboratory of Clamart. According to him, it was necessary to design a device that could be performed in any laboratory, at least for the first part of the experiment, which is the step of recording. With digitization, the problem of the “imprinted” samples, which sometimes mysteriously “exchange” their respective biological activities, should not *a priori* arise any more because the biological activity was recorded at the Cochin institute on a computer’s hard disk. At Clamart the recordings were “played” to naive water. The question concerning the transport of the samples of water between the two places that appeared to be a source of trouble was thus resolved.

The public demonstration performed at the Cochin institute on February 27th, 1996 needs to be described in detail. Indeed, probably thinking that he finally had the solution to his problems thanks to the new method involving computer files, J. Benveniste did not hesitate to launch a complex and ambitious experiment.

During this experiment, the experimenters had to determine the activities corresponding to 18 recordings: 6 acetylcholine, 6 ovalbumin and 6 water (inactive controls). For the first step, the 12 active recordings and the 6 inactive recordings were identified. For the second step, the samples with ovalbumin-type activity or acetylcholine-type activity were identified among the 12 active recordings. Indeed, ovalbumin-type activity could be evidenced only on the heart of ovalbumin-sensitized animals; acetylcholine-activity could be evidenced regardless the immunological status of the animal. This second stage was intended to show that the specificity of the original molecule was preserved through transfer and digitization.

Technical sheet of the experiment of February 27th, 1996

Type of experiment: transmission-digitization
Place of experiment: Cochin institute for digitization on May 12th and at Clamart for transmission and assessment of samples from July 4th to May 23rd
Place of experiment: Cochin institute for digitization on February 27th and at Clamart for transmission and test of samples from February 28th to March 8th
Blinding: On February 27th by participants not belonging to Benveniste's laboratory
Number of recordings to be tested: 18 (6 ovalbumin, 6 acetylcholine and 6 water)
Additional in-house blinding: yes



Blinding of 18 recordings numbered from 1 à 18 :
6 recordings « **Water** »; 6 enregistrements « **Ova** »;
6 recordings « **ACh** »

(*tested after **transmission** to water sample)*

First step: identification of the active samples

At first, the recordings were "played" to naive water which was administered to hearts (from guinea pigs immunized with ovalbumin) reacting both to ovalbumin and acetylcholine. Twelve recordings which were active on the coronary flow could be identified (they were expected to correspond to ovalbumin or to acetylcholine).

Tested recordings	Number of measurements	Maximal changes of coronary flow (%)	Biological activities in increasing order
n°6	3	3.1 ± 0.6	1
n°9	4	4.7 ± 2.8	2
n°15	4	5.1 ± 2.4	3
n°2	6	5.8 ± 3.6	4
n°18	8	5.8 ± 3.9	5
n°12	4	6.1 ± 2.9	6
n°4	3	16.7 ± 4.6	7
n°5	3	18.7 ± 5.4	8
n°13	4	19.3 ± 3.7	9
n°8	4	21.0 ± 8.3	10
n°10	6	24.8 ± 15.0	11
n°14	4	25.6 ± 10.8	12
n°1	4	26.9 ± 12.2	13
n°17	4	28.0 ± 11.4	14
n°16	4	28.4 ± 13.7	15
n°11	4	29.1 ± 9.1	16
n°7	3	29.4 ± 18.8	17
n°3	4	31.6 ± 16.6	18

6 inactive (< 10%)

12 active samples (> 10%)

Means ± standard deviation

Table 13.1. The experiment of February 27th, 1996 contained 18 recordings: 6 for ovalbumin, 6 for acetylcholine and 6 for water (control). If the experiment confirmed the hypothesis of a transmission of the biologic activity, one should observe changes of coronary flow for 12 recordings. Hearts were obtained from guinea pigs immunized with ovalbumin. The modifications of the coronary flow measured with two devices of Langendorff gave coherent results. Finally an in-house blinding was performed for 8 recordings to confirm the first measurements; for this purpose, the "imprinted" samples were given to the experimenter under a different name to verify the first measurements.

A change of the biological parameter (change of coronary flow) was indeed observed for 12 out of 18 recordings: n°1, 3, 4, 5, 7, 8, 10, 11, 13, 14, 16 and 17. The following stage would allow discriminating among the ovalbumin recordings and the acetylcholine recordings.

Second step: identification of the specific activities of the active samples

The distinction of the recordings of ovalbumin and acetylcholine was made during the second step by taking advantage of the characteristics of the initial molecules. Indeed, on one hand, the effect of acetylcholine is inhibited by atropin and on the other hand ovalbumin has an effect only on hearts coming from animals that had ben previously sensitized to ovalbumin.

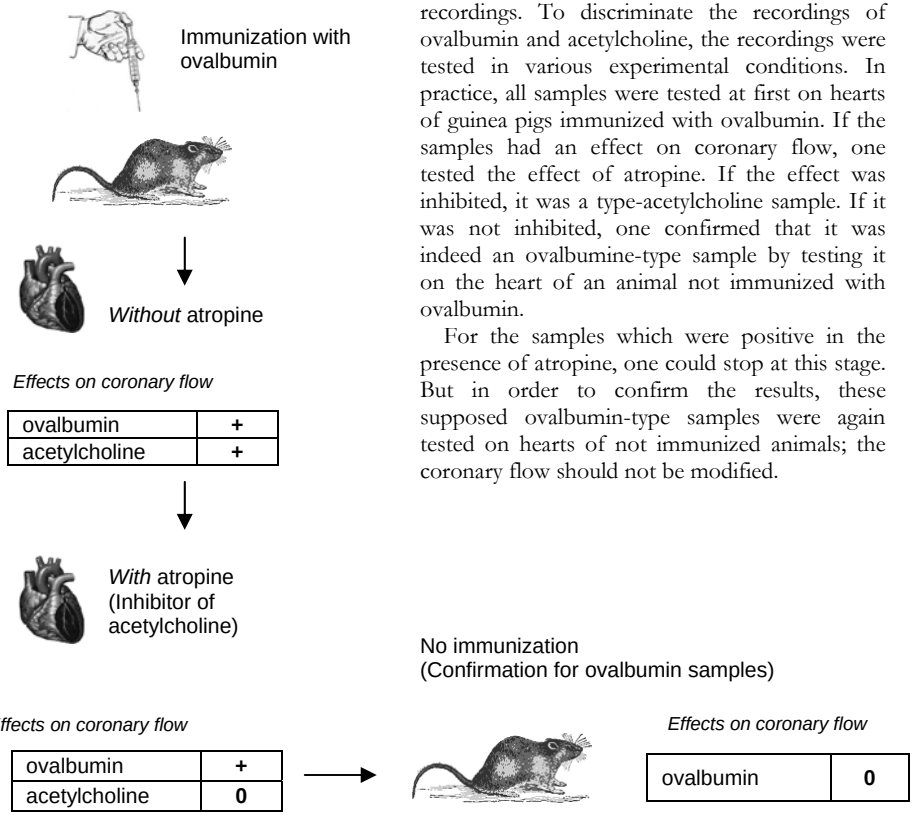


Figure 13.1. Demonstrating the specificity of the recordings. To discriminate the recordings of ovalbumin and acetylcholine, the recordings were tested in various experimental conditions. In practice, all samples were tested at first on hearts of guinea pigs immunized with ovalbumin. If the samples had an effect on coronary flow, one tested the effect of atropine. If the effect was inhibited, it was a type-acetylcholine sample. If it was not inhibited, one confirmed that it was indeed an ovalbumine-type sample by testing it on the heart of an animal not immunized with ovalbumin.

For the samples which were positive in the presence of atropine, one could stop at this stage. But in order to confirm the results, these supposed ovalbumin-type samples were again tested on hearts of not immunized animals; the coronary flow should not be modified.

The biological activities of 6 recordings appeared to correspond with acetylcholine because they were inhibited by atropine and 6 appeared to correspond to ovalbumin because they were not inhibited by atropin and were active only on hearts from immunized animals.

	Type-acetylcholine activity (Maximal % of coronary flow change)			***Type-ovalbumine activity*** (Maximal %. of coronary flow change)		
	Animals immunized with ovalbumin			Animals immunized with ovalbumin		Animals not immunized with ovalbumin
Rec. n°	Without atropine	With atropine	**Enr. n°**	Without atropine	With atropine	
1	25.6	5.7	**4**	17.7	20.3	8.3
3	28.9	4.5	**5**	29.1	45.8	6.2
7	34.5	8.0	**8**	19.6	21.9	3.7
10	27.2	6.7	**13**	18.4	19.6	6.9
14	24.8	6.8	**16**	28.8	26.8	Non fait
11	27.5	19.4*	**17**	37.0	26.9	7.6

* For the sample n°11, the inhibition was only partial; since this sample was active with not immunized animals (42%), this suggested that it was indeed an acetylcholine-type activity. Furthermore, acetylcholine in "classic" conditions was not inhibited by atropine in this experiment. It was thus decided to classify this recording in the acetylcholine group .
Rec.: recording.

Furthermore, three samples (6, 9 and 12), which were considered as inactive during the first step were tested once again and indeed seemed to correspond to "water" activity because they were again found inactive in this second step of the experiment.

Recording n°	Without atropine	With Atropine
6	3.9	3.8
9	4.8	7.1
12	5	2.6

"The results do not fit with the codes"

Everything thus seemed to match and it would be most surprising if the observed biological activities did not correspond to the code. But, again, after unblinding, there was disappointment mixed with incomprehension.

Experimental result	Inactive (***Water-type*** activity)					
N° of recording	2	6	9	12	18	15
Unblinding	Ova	Water	Ach	Ach	Water	Ova

Experimental result	Active with ***Ach-type*** activity					
N° of recording	1	3	7	10	11	14
Unblinding	Water	Ova	Ova	Water	Ova	Ach

Experimental result	Active with ***Ova-type*** activity					
N° of recording	4	5	8	13	16	17
Unblinding	Water	Ach	Water	Ova	Ach	Ach

J. Benveniste then commented on this experiment in these terms:

> "Here are thus the results of this experiment. They are at the same time remarkable and disappointing. Remarkable because, as you can see in the enclosed tables, these experiments work perfectly, in all the compartments of the game. Disappointing because the results do not fit the codes." [1]

In spite of the "technological jump" on which so many hopes had been based, it was once again the same situation as in the past when, on numerous occasions, the code did not fit with the results. As long as one did not unblind the experiment, everything was fine! Before unblinding there was indeed coherence between available information on the "expected" results and the observed results. If one considered the experiments from the outside, the most obvious conclusion was that the attitude of J. Benveniste who hanged on to these experiments was totally irrational.

Furthermore, the interferences which had been suggested as the possible explanation of the previous failures during the transport of tubes until Clamart did not hold any more. It was indeed computer memories which were

transported. It was difficult to imagine a similar mechanism which would arise during the transport. Nevertheless, once again, J. Benveniste tried to find an explanation for these disturbing oddities. He had the hard disk of the laptop computer examined and – for a while – he could thus hold onto an explanation:

> "As demonstrated in the enclosed document, a breakdown of FAT (File Allocation Table), obviously unpredictable, arose on our hard disk which must be replaced. According to the IT specialists this breakdown produces random distributions of files. One notices that the inactive tubes which we detected were replaced according to a particular algorithm: after the initial 2, these files follow one another on the hard disk 3 by 3, what is little compatible with an allocation of random numbers."

Then J. Benveniste explained that the recordings made on the hard disk were compared with their copies on floppy disks which had been kept by the bailiff. Computer files being similar, he deducted that the "anomaly" occurred at the time of the recording of computer files on the hard disk and not at the time of their "reading" to water.

And he concluded:

> "We can thus consider that, without this computer incident which is probably the cause of the disorder of the codes, we would have demonstrated the possibility of recording specific molecular activities on a hard disk, replaying them and recognizing them specifically".

M. Schiff who received the report of the experiment noticed that J. Benveniste himself dug deeper in his quest of the "crucial experiment". He wrote to him in these terms:

> "At first a general comment that I have already expressed several times, but that I repeat because I think it is fundamental. It seems to me that you are trapped by the desire, hopeless in my opinion, to fight the suspicion of fraud. This brings you to present your results as a bet on horse races, in which the objective would be "to guess" the identity of tubes or recordings instead of underlining the internal coherence of the results. […]
>
> The most rigorous statistical analysis in my opinion is based on the analysis of the ranks of files. The least "active" 6 files of the first series are files 9, 6, 2, 12, 15 and 18. The least active six files of the second series of measurements are the same ($p= 6! \times 12!/18! = 1/18500 = 0.5 \times 10^{-5}$). In the third series, you tested

> only three of the least active 6 files. They still find themselves among the 3 least active among the 15 tested ($p=3! \times 12!/15! = 1/455 = 2 \times 10^{-3}$)" [2]

In other words, M. Schiff thus insisted on the internal coherence of the experiment which, from a statistical point of view, cannot be due to random. To verify that this failure is indeed related to simple computer problems, J. Benveniste suggested redoing other experiments, but less ambitious ones to begin with.

Notes of end of chapter

[1] Letter of J. Benveniste of March 26th, 1996 to the participants in the experiment of February 27th, 1996.

[2] Lettre of M. Schiff to J. Benveniste of March 31st, 1996.