

Chapter 14. "It could well be that we hold the explanation of the mystery"

"We are now very close to the conclusion"

After having fixed the computer "problems", namely the supposed cause of the "mixing" of the recordings of the experiment of February 17th, 1996, a new public experiment was organized on May 7th, 1996. As already said, this experiment was more limited than the previous one. The objective of the experiment was to identify five active recordings (recordings of ovalbumin) and five inactive recordings. Discriminating the specificity of various "active" recordings was not the purpose of the experiments. The recordings took place as usual at the Cochin institute (see technical sheet).

When the evaluation of the recordings was ended and when the unblinding was done, J. Benveniste as usual sent a report to the participants:

"Here is the result of the experiment recorded on May 7th at Cochin Hospital. Exceptionally, we also send these results to all participants of February to allow those who wish coming on board again. We are now very close to the conclusion of this series of experiments." ¹

After this quite optimistic sentence, J. Benveniste tackled the results (Table 14.1):

"As you can see in the enclosed table, we inverted the results of the first 4 recordings and correctly identified 6 others. [...]"

This experiment allowed us to understand where the anomaly is located: it does not arise at the time of the recording (it is largely confirmed that we are capable of recording and of digitizing biological activities), nor at the time of the reading. It is in the order of the recordings such as they are administered to the heart that these anomalies occur. I cannot go into experimental details here, but the result of these anomalies is that the heart reacts in fact to the *previous* injection. This anomaly is completely induced by the blind procedure: when a tube is not active in first intention (heart with low sensitivity, recording with low intensity), even if it is a tube "Ova" we think that it is water and we do not change, for reasons of economy, the catheter of injection. During the next injection, if the tube is "Ova" it will work and we will be correct,

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if the tube is "Water", the infusion liquid will gain information in contact with the pipe and we will confuse it with Ova."

Tested recordings	Number of measurements	Maximal changes of coronary flow (%)	Biological activities in increasing order	Unblinding
<i>Blind tests</i>				
n°7	7	4.6 ± 1.7	1	Digital water
n°5	3	4.9 ± 2.7	2	Digital water
n°3	6	6.2 ± 3.5	3	Digital ova
n°9	5	6.7 ± 2.8	4	Digital water
n°1	8	7.7 ± 5.1	5	Digital ova
n°10	6	13.1 ± 8.6	6	Digital ova
n°8	5	16.3 ± 7.0	7	Digital ova
n°2	4	18.9 ± 8.0	8	Digital water
n°6	5	20.2 ± 8.2	9	Digital ova
n°4	3	20.5 ± 4.9	10	Digital water
<i>Open-label tests</i>				
Digital water	9	4.6 ± 3.7	-	-
Digital ova	11	21.9 ± 27.4	-	-
Ova 0,1 µmol/L	12	24.0 ± 3.9	-	-

Table 14.1. Public experiment of May 7th, 1996. As expected, 5 recordings induced a change of the coronary flow (2, 4, 6, 8, 10) above 10% and the 5 others were considered as inactive (1, 3, 5, 7, 9). One could think that the first ones corresponded to the recordings of ovalbumin (ova) and the following ones to the recordings of water. After the unblinding, the activities of the first 4 recordings were "inverted" whereas the activities of the 6 next ones were correctly identified. The results with open-label recordings were as "expected" as well as ovalbumin at classical concentration (0.1 µmol/L) tested systematically at the end of each experiment to verify the reactivity of the heart.

In this table and the next ones, results are given as mean ± standard deviation.

Technical sheet of the experiment of May 7th, 1996

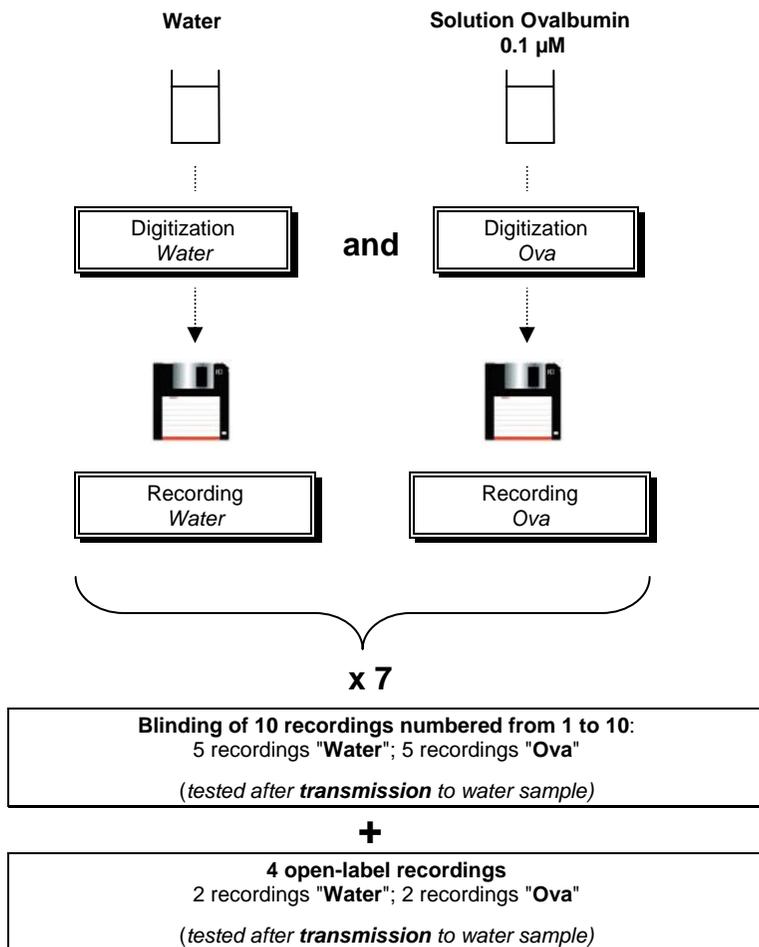
Type of experiment: transmission-digitization

Place of experiment: Cochin institute for digitization on May 7th and at Clamart for transmission and assessment of samples from May 9th to May 15th

Blinding: On May 7th by participants not belonging to U200

Number of recordings to be tested: 10 (5 ovalbumin and 5 water)

Additional in-house blinding: yes



J. Benveniste thus suggested for the future experiment to systematically change the fine flexible pipe which drove "informed" water to the heart and to test twice in row every sample. This procedure was however more expensive and more time-consuming. But, with this method, J. Benveniste thought he could now succeed, because by testing again some of the samples of the previous experiment again and by applying this method, he obtained the "expected" results:

"After unblinding, we experimented this method in blind experiments on tubes 1 till 4 and identified them this time in the correct order: Ova/Water/Ova/Water. We are thus going to hold a public meeting again during which we will record a series Water/Ova and a series Water/ACh (acetylcholine). We will introduce a further difficulty: for each series, there will be 20 labels of the couple Water/Ova or Water/ACh from which only 10 will be randomly selected, therefore we will not even know the respective number of recordings Water and Ova or ACh. That should work but it is research and we are not shielded from another unexpected difficulty."

J. Benveniste addressed two important points here. On one hand, the number of active/inactive samples was known until now. Only their distribution must be determined. On the other hand, he indicated that on a small series, he found correctly the expected effects at the good places. The tubes from 1 to 4 which were inverted were then correct (compare Tables 14.1 and 14.2).

Tested recordings	Number of measurements	Maximal changes of coronary flow (%)	Biological activities in increasing order	Unblinding
<i>Blind tests (in-bouse)</i>				
n°2 of May 7 th	4	4.5 ± 1.7	1	Digital water
n°4 of May 7 th	2	7.4 ± 0.4	2	Digital water
n°1 of May 7 th	4	15.4 ± 4.3	3	Digital ova
n°3 of May 7 th	4	19.2 ± 7.0	4	Digital ova
<i>Open-label tests</i>				
Ova 0.1 µmol/L	3	34.5 ± 12.0	-	-

Table 14.2. After the unblinding of the experiment of May 7th, J. Benveniste tested again 4 recordings (from n°1 to 4) which gave "abnormal" results. These recordings thus served again to "imprint" samples of naive water (experiments performed on May 21st and 23rd). The samples of "informed" water were then given blind to the experimenter for tests on the Langendorff device. "Expected" results were then obtained (compare with Table 14.1).

“Explaining the mystery”

As planned, the public experiment of June 12th was performed in two parts. Two series of 8 recordings were performed, each series containing an unknown number of recordings supposed to have a biological activity. After the unblinding of the experiment on July 24th, in a well-oiled ritual, J. Benveniste announced the results of the experiment to the participants (Table 14.3:

“The experiment) of June 12th is a failure (see however the appendix). We are in the usual situation: very clean results where tubes are repeatedly measured under different numbers give coherent results... which however have nothing to do with the code. One notices the same phenomenon as during the experiments of February 27th and May 7th: the results are distributed according a regular algorithm: here a positive tube is always followed by two negative tubes. The contrast with real random distribution shows that there is indeed something abnormal.”²

Beginning to be short of *ad hoc* hypotheses, J. Benveniste suggested nevertheless possible problems related to the computer, but apparently without much conviction:

“I remind you that the recordings were made with one floppy disk for each file. However, maybe I made the error to group them together on the hard disk of the computer because, probably according to the lack of RAM, this one reads directly on the floppy disk what induces an important wow. [...] Having said that, there is no valid hypothesis that allows explaining a “mixture”, a reorganization of the activities.”

He thus concluded:

“We are incapable to know if the abnormalities arise in large series during the recording on the computer or during the measurement, the heart being submitted to multiple stimulations would thus give any answer. None of the elements mentioned above allows choosing one of these hypotheses and explains this history of *bizarre algorithm observed three times in a consecutive manner.*”

Technical sheet of the experiment of May 12th, 1996

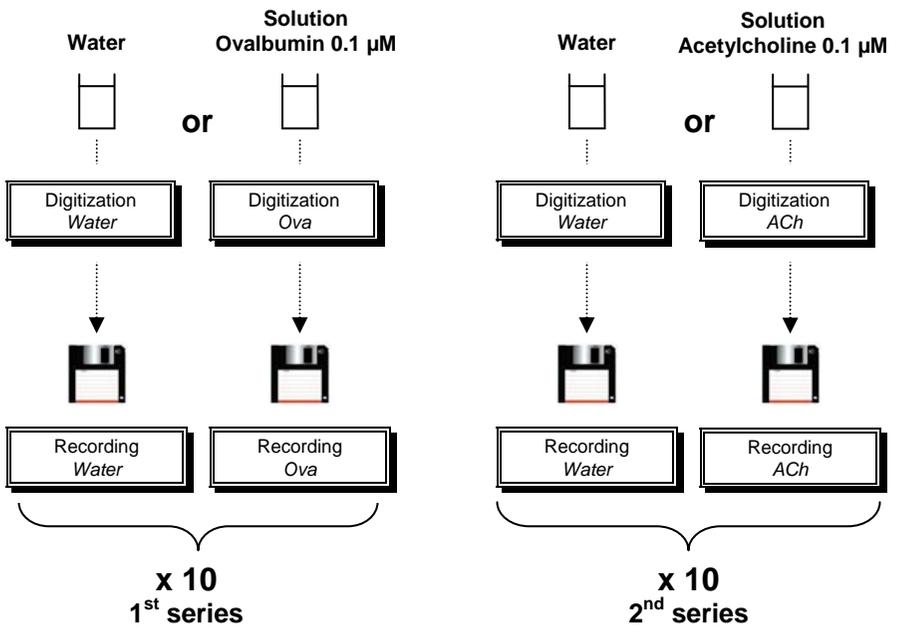
Type of experiment: transmission-digitization

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

Blinding: On June 12th by participants not belonging to U200

Number of recordings to be tested: 2 series of 8 recordings (water or ovalbumin; water or acetylcholine); unlike previous experiments, the number of active samples was not known for this experiment.

Additional in-house blinding: yes



Blinding of 16 recordings:

1st series: 8 recordings "Water" or "Ova"
(numbered from 1 to 8)

2nd series: 8 recordings "Water" or "ACh"
(numbered from 11 to 18)

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

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Tested recordings	Number of measurements	Maximal changes of coronary flow (%)	Biological activities in increasing order	Unblinding
First series				
<i>Blind tests</i>				
n°3	4	4.3 ± 1.2	1	Digital ova
n°4	4	5.3 ± 3.0	2	Digital water
n°1	4	5.6 ± 2.7	3	Digital water
n°6	4	6.0 ± 0.5	4	Digital ova
n°7	4	6.7 ± 2.9	5	Digital ova
n°5	4	15.6 ± 2.5	6	Digital ova
n°8	9	19.8 ± 5.7	7	Digital ova
n°2	4	23.8 ± 5.5	8	Digital water
<i>Open-label tests</i>				
Digital ova	10	21.0 ± 8.9	-	-
Ova 0.1 µmol/L	9	26.4 ± 11.1	-	-
Second series				
<i>Blind tests</i>				
n°15	2	4.2 ± 0.1	1	Digital ACh
n°18	2	4.3 ± 0.0	2	Digital water
n°13	2	5.5 ± 1.7	3	Digital ACh
n°12	3	6.3 ± 3.7	4	Digital water
n°16	2	6.5 ± 0.3	5	Digital ACh
n°17	9	10.9 ± 4.2	6	Digital water
n°14	3	14.7 ± 1.6	7	Digital ACh
n°11	8	17.7 ± 8.4	8	Digital ACh
<i>Open-label tests</i>				
Water digit.	1	4.3	-	-
Digital ACh.	2	13.8 ± 2.5	-	-
ACh 0.1 µmol/L	9	17.6 ± 3.4	-	-

Table 14.3. Experiment of June 12th, 1996. This experiment included two series with an unknown number of active and inactive recordings. The active recordings corresponded to ovalbumine (ova) in the first series (recordings from n°1 to 8) and acetylcholine (ACh) in the second series (recordings from n°11 to 18). As one can notice, there were 5 active recordings in each series, but only 3 were found in each one. Furthermore, the results did not fit the code. Thus, a recording supposed to have no effect (control) could be accompanied with a spectacular biological effect (see for example sample 2). Only chance seemed to be responsible of the distribution.

Returning on the possible anomaly related to the hard disk, J. Benveniste summarized the previous events and proposed a new explanation for these anomalies:

“These observations led us to question the distribution of files on the hard disk. For this purpose, we recorded on floppy disks on June 12th at Cochin, with one floppy disk for one recording. However, when we replayed these floppy disks on an external hard disk I made an error of strategy: wanting to use a computer more powerful than the laptop to “imprint” the tubes of water, I copied all the floppy disks on an external hard disk which I then transferred to the office computer. We then replayed the activities contained on this hard disk. My error can partially be understandable by the fact that I believed that the anomalies of file allocation on the hard disk occurred at the time of the recording. Moreover the office computer cannot play floppy disks without distortion (wow).”

Although this umpteenth *a posteriori* interpretation of the results was hardly convincing, the next information given by J. Benveniste was nevertheless surprising:

“Given the catastrophic results of the unblinding of July 24th, I decided to play one by one the floppy disks recorded at Cochin on June 12th directly on the laptop, without any recording whatsoever on the hard disk. The results speak for themselves: *the activities measured with internal blinding were attributed to the good tubes according to the code (see table).*”

Indeed, on July 25th and 26th, new measurements were made with some recordings of June 12th. The results are described in Table 14.4.

In other words, as for the experiment of May 7th, when somebody of the team knew the code (J. Benveniste in this specific case), the code fitted the results. The experimenter, J. Aïssa, who performed the experiments, was blinded. Moreover, this “phenomenon” did not appear to be specific to the experiments of “digital biology”. The reader remembers the transmission experiment of May 13th, 1993 (cf. Chapter 8) where M. Schiff did in-house code; consistent results had been obtained.

Tested recordings	Number of measurements	Maximal changes of coronary flow (%)	Biological activities in increasing order	Unblinding
<i>Blind (in-house) tests</i>				
n°1 of June12	2	4.3 ± 1.4	1	Digital water
n°4 of June12	2	4.3 ± 3.5	2	Digital water
n°2 of June12	4	6.3 ± 1.7	3	Digital water
n°3 of June12	3	13.4 ± 0.8	4	Digital ova
n°13 of June12	3	13.4 ± 4.8	5	Digital Ach
n°6 of June12	3	20.3 ± 5.5	6	Digital ova
n°7 of June12	1	33.9	7	Digital ova
<i>Open-label tests</i>				
Ova 0.1 µmol/L	4	22.5 ± 6.5	-	-
ACh 0.1 µmol/L	2	18.1 ± 3.3	-	-

Table 14.4. After the unblinding of the experiment of June 12th, 1996, J. Benveniste tested again 7 recordings of this experiment and "imprinted" samples of water (measurements performed on July 25th and 26th). He gave then these samples blind to the experimenter. "Good" results were obtained. Compare with Table 14.3.

The idea that "in-house" knowledge of the code allowed to get "expected" results was of course a concept – if there was actually a concept – difficult to convey because, on one hand, it was very difficult to give an explanation and, on the other hand, this left the door open to all the suspicions. J. Benveniste knew however that his collaborator who handled the experimental devices had no knowledge of what he "must" obtain. All this remained incomprehensible. J. Benveniste readily admitted and he expressed his perplexity:

"I have obviously no explanation for these anomalies of ranking of activities on a hard disk which, on the standpoint of IT logic, makes no sense. It would however be necessary to ask to a specialist of IT processing of sounds if such phenomena do not occur for example with music files. [...]"

And, nevertheless, he optimistically concluded:

"Taking into account this advance of what appears to be now a control of the recordings of biological activities, we think we can complete the experiments in the first two weeks of September, plus a second experiment by transfer (on floppy disks!) from Chicago. An article in a top-notch journal could be sent by end-September or mid-October."

Before describing the “Cochin experiments” performed during the autumn, of 1996, let us see what are these “experiments of Chicago” to which J. Benveniste alluded.

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Notes of end of chapter

¹ Letter of J. Benveniste of May 24th, 1996 "to the participants in the experiments of February 27th and May 7th, 1996".

² Letter of J. Benveniste of July 24th, 1996 "to the participants in transmission experiments".

³ I have no explanation about this regularity of the distribution between "inactive" and "active" samples. Maybe it corresponded to the (wrong) idea of what "random" distribution should be...