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Letter to the Editor

Floyd Landis: An unsafe conviction, regardless of the quality of the data

Dear Editor,

A recent debate in this Journal [1,2] has centered on the quality of the isotope ratio mass spectrometry (IRMS) data in the Floyd Landis case. Here, some fundamental problems with current doping tests are outlined with the purpose to strongly argue from a fairly broad perspective that Floyd Landis is the victim of an unsafe conviction. For simplicity, the IRMS data quality is not questioned. Neither do we wish to discuss the processing of the (raw) data, although e.g. not being able to reproduce calculations during the trial does not speak in favor of the prosecution. Nevertheless, one can imagine that this author finds it particularly disturbing that accounts in the open literature (see [2] and references cited) largely ignore serious doubts about the IRMS method on the side of some anti-doping researchers, so unambiguously worded as follows in an internal document [3]:

> "Moreover, given that reservations have been expressed on the validity of the IRMS method, scientific background for its use would also be appreciated."

Interestingly, this document reports on a closed meeting (Advisory group on science, Council of Europe, 11 July 2006) that almost coincided with the ominous test (Tour de France, Stage 17, 20 July 2006). Its relevance is therefore difficult to ignore.

1. Reliance on a single piece of material evidence

To better appreciate the arguments, throughout, the undisputable fact should be borne in mind that reliance is entirely on a *single* fully isolated piece of material evidence *only*, namely (processed) instrumental data. Moreover, the evidence in doping trials cannot be seen as the confirmation of a targeted suspicion; it merely results from a 'fishing expedition' during which the athlete's sample is subject to various tests. In forensic terms, the accused athlete is a 'cold hit suspect'.

It stands to reason that a rigorous statistical underpinning of the conclusion of 'guilt' becomes imperative when working without further supporting evidence, regardless the quality of the data. For example, forensic scientists know very well that an excellent DNA-match resulting from a library search is to be treated with extreme caution. After all, what to do with the second-highest in the hit list? However, Berry [4] has already detailed that the conclusion of a doping offense is not properly validated for the IRMS method. Stated differently, a rigorous statistical underpinning is by definition lacking in the Floyd Landis case. Then, how in the world is it possible that Floyd Landis was convicted?

2. Doping trials are extremely unfair

The rather sad answer is that doping trials are extremely unfair towards the accused athlete [5]. Over the last decades, doping regulations [6] have converged to the situation where a decisive status is conferred upon a single fully isolated piece of material evidence. The experts for the defense can only point in the direction of procedural errors that might have caused the 'positive' result. If, in turn, the experts for the prosecution succeed countering these 'complaints', the conviction is a fact. Any presumed lack of science behind the test cannot be brought to the table, which is truly horrifying for scientists. The reader should contrast this factual account to what Bowers [2] advances as his opinion:

> "In my opinion, an expert is required to impartially review the totality of the documentation in order to reach an informed opinion."

In such a situation, the two standard options are as follows. Either Bowers does not know that the expert for the defense is not allowed to "impartially review the totality of the documentation", or he does know but doesn't care.

3. An adverse analytical finding is not necessarily conclusive evidence of doping

A cynical person could interpret the advantageous position of the expert for the prosecution as a reward for what appears to be a *misconception* on the side of many anti-doping researchers, namely the presumed equivalence of an adverse analytical finding (AAF) and the guilt of a doping offense. To understand that guilt does not automatically follow from an AAF, often not even remotely, consider the results of a survey conducted by the World Association of Anti-Doping Scientists (WAADS) on the results of T/E analysis—the (current) screening test for exogenous testosterone (T and E stand for testosterone and epitestosterone, respectively). The following is a literal quote from the internal document [3]:

> "25 out of 33 accredited laboratories replied, representing 130,018 samples. 3265 of these samples produced an adverse analytical finding in 2005. Among these, 955 (29%) of the AAF had $4<T/E<6$. These samples had therefore to be confirmed either by IRMS or by reviewing the results of any previous test(s) or conducting subsequent test(s). Only 3 of the 955 samples have been confirmed (2 by IRMS and 1 by follow-up study), but not all laboratories have IRMS and also the outcomes of follow-up or previous tests are not always known by the laboratories. However, only 2 of the 789 samples analysed by IRMS contained testosterone or its precursors.
>
> With regard to cases with $T/E>10$ which had been analysed with IRMS, the same survey provided the following results:
>
> $10>T/E>15$: 11 confirmed, 14 not confirmed
> $15<T/E<20$: 7 confirmed, 2 not confirmed
> $T/E>20$: 26 confirmed, 1 not confirmed".

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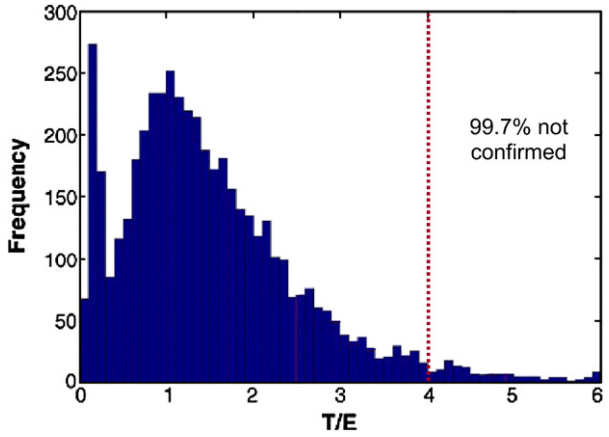

Fig. 1. Distribution of T/E ratio of professional sportsmen ($n = 4885$). Adapted from [7].

One observes that in the class $4 < T/E < 6$, 952 of the 955 samples are not confirmed, i.e. 99.7%, see Fig. 1 for an illustration. For this class of AAFs, the result, no matter how accurately determined (sampling, measurement), is more than anything a proof of being 'clean'. Moreover, even for the highly eccentric class of AAFs $15 < T/E < 20$, 22% (2 out of 9) is not confirmed. One would like to see a similar validation for the IRMS test, but it does not seem to exist.

It is reiterated that the T/E test is currently only used for screening. However, until the relatively recent introduction of IRMS testing, T/E tests were sufficient in themselves to prove doping, and anti-doping authorities confidently attested to their accuracy in predicting the use of testosterone or its precursors.

4. Concluding remarks

Bowers concludes with:

"As Paul Harvey used to say "Now you know the rest of the story.""

This author would be happy to exchange the extensive deliberations about the quality of the data and the more than 4000 pages of documentation provided to the defense—'the story'—for a rigorously validated statement of the kind "I am 99.9% (say) confident that the adverse analytical finding obtained for Floyd Landis has resulted from doping." Stated differently: Bowers is invited to give meaning to the statistical term 'significantly' in the following claim:

> "That analysis showed that a metabolite of testosterone in his urine sample had significantly less ^{13}C than his other endogenous steroids."

Until then, there can be no doubt that this was an unsafe conviction, regardless the true quality of the data.

References

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