A proposal for a Clinical Trial fat contract use case

In the US, the pharmaceutical industry has very little data transparency in its clinical trials. Only 25% of drugmakers make their clinical trial results publicly available after the FDA approved it. This is problematic for two reasons: 1) the US is a global pharmaceutical giant. These drugs get distributed to the whole world. 2) These clinical trials, different from academic ones, are for-profit. Drugmakers are inherently incentivized to tamper with clinical trial data in retrospect, so the drugs get approved quicker with falsified data. This is where blockchain can bring security because it offers a chronological, tamper-proof log for the data stages a clinical trial goes through.

Two other features of clinical trial data that suit a blockchain use case:

- **Once input, results/data should never be updated or deleted** (Increase FDA's accountability in its approval + for fully-disclosed peer-review)
- **Must be read-available, long term** (For data reference to these important clinical trial results + shared knowledge base)

Moreover, there is conflict over who should own the data. A case can be made for the drugmakers because they funded their own clinical trials. But, with sensitive patient information and trial data that have far-reaching implications, the data seems too important to be stored in a private database. FDA (a third party) also has an existing aggregated database of these results, but only 10% of them exist there - it hasn't effectively enforced drug-makers to make it available. On the other hand, data is owned by no one on the blockchain.

I propose a fat contract that provides a data progression framework for drug clinical trials. Private researchers must first define the data type, statistical tests, and hypothesis in the contract, then deploy the fat contract containing the clinical trial protocol into the network. This prevents the research plan AND the hypothesis from changing midway, preserving the proper scientific method (as well as outlier thresholds, p-value thresholds, etc.). At every stage, data is inputted, with the blockchain preventing it from being rewritten for ulterior, profit-driven motives. Simple computation of statistical tests can also be written into the contract. If the research plan has a bug, the researchers must define a brand new fat contract, and the immutable old plan exists for a reference to a failure state. Obviously, this cannot prevent researchers from faking all data from scratch.

Phala gives three benefits on top of the general blockchain technology: **1) Internet**: drug makers can publicly display the data progress of their clinical trials in real-time. **2) Encryption**: they can display so without showing what the underlying data is to protect their commercial interests if the drugmaker desire so. The public doesn't know what the data is during the trials, but it knows data exist and cannot be tampered with. **3) Respond to external events**: if FDA approves the trial results, the fat contract automatically decrypts the data to provide instant transparency - no FDA (third party) is needed in enforcing transparency. This ensures FDA's approval must be well-justified and the pharmaceutical must be accountable to display results.

Phala also provides more computational power, but it's unclear if that much computation would be involved anyway. It could, however, scale with more participating drugmakers or clinical trials results.

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