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Double Trouble

Question asked in *New Scientist* 3412 (12 NOV 2022):

If identical twin brothers are each potentially the father of the same child, is there a way to determine, genetically, which is the father ?

Answer published in *New Scientist* 3422 (21 JAN 2023), p 54:

From one generation to the next, there are always some small changes, called mutations, among the 3 billion or so base pairs of the human genome. In order to identify which identical twin is the father, you would need to identify the mutations that ended up in their reproductive tissue, or germ line and which occurred soon after the fertilised egg split into two, going on to develop into the twins.

On average there are between 10 and 20 such mutations between identical twins. To identify these, one would need to get samples of semen from both twin brothers, and tissue samples from the child and its mother and then obtain high quality genetic sequences from all of these.

Even so, it isn't always possible to identify which of the brothers is the father, as in one-tenth of such cases, no mutations occurred in the early development of the twins, but, in the most favourable instances, there might be more than 100 mutations.

In the case of identical triplets, some mutations may affect two of the brothers and not the third one.

Main references used [not cited in the publication] :

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Weber-Lehmann J, Schilling E, Gradl G, Richter DC, Wiehler J, Rolf B (2014) Finding the needle in the haystack: differentiating “identical” twins in paternity testing and forensics by ultra-deep next generation sequencing. **Forensic Science International: Genetics** 9: 42–46

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