Can a Child have more than one Father?

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This short article is a request for more research into polyspermy, an important area of human embryology, as there is anecdotal evidence that conflicts with the received view.

I have made a number of observation over the years of family traits and characteristics as they are passed through several generations, and have seen some anomalies and curiosities that are not explained by conventional genetics. A situation where all four grandparents and both parents have pale skin, straight hair and roman noses, and all their children are similar except for one who has lightly pigmented skin, a very different nose and naturally curly hair, yet has other characteristics that clearly come from both parents. I have observed a surprising number of such anomalies in several different families and have sought to gain a better understanding from published research. I was disappointed to discover a lack of available information on the internet.

There seems to be some confusion over the mechanism whereby a human ovum is fertilised by sperm. Wikipedia, usually so very reliable, has a number of apparent contradictions when compared with observations by those working in this area. At one point, it clearly states that only one single sperm can ever fertilise the ovum, and that mechanisms are in place that prevent polyspermy, (the fertilisation of an ovum by more than one sperm), yet it is common knowledge that, after exposure to unlimited sperm, 60-80 sperms can be seen with their tails protruding from the ovum.

Organisations performing in vitro fertilisation have a lot of information that has never been published. For instance, they sometimes use a single sperm injected into an ovum, (intracytoplasmic sperm injection), but success rates are only 12-16%, whereas unlimited sperm quantities in contact with the ovum achieves over 80% success rate. This information has not been published and comes from private discussions with acquaintances in the industry, all of whom need to remain anonymous because of confidentiality clauses in their employment contracts. I am told that some IVF organisations have experimented with limiting the number of sperms used, and fertilisation success rates increase with the number of sperms, and flatten out at around 80% when the sperm count exceeds about 16. The above observations, taken together, imply that polyspermy does very frequently occur.

We know that sperm cells remain viable in the mother's abdominal cavity for at least 2½ days, and perhaps as much as 4 days. If, during that time, the woman has had unprotected sex with more than one man, she may have viable sperm from several different males in her abdominal cavity at the time of ovulation. If we accept that polyspermy can occur, this could have the effect that sperms from several different males may penetrate and fertilise the ovum, and that chromosome halves from several different males may have contributed to fertilisation.

I have spoken with some acquaintances in the DNA testing industry who report that, when they are testing to resolve paternity disputes, they have sometimes found DNA from two or more of the suspected fathers in the sample from the child. They never report this however and simply identify, as the father, the male with the largest number of positives. Since most of these testing organisations look at only five or six chromosomes of the twenty-three in the human, it is possible that a full test of all chromosomes could give a significantly different result. A very small number also report that they have very infrequently found a single chromosome where the two halves come from two different males, (i.e. no chromosomal material from the mother), but they have never seen any instance where both halves originate from the same male. These observations have never been published either, and I believe that some publication of

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research in this area would significantly benefit our understanding of this important process.

If all of these observations are correct, it implies that something quite complex is going on in the ovum. If a selection is being made, whereby a chromosome that is defective or missing in the ovum is replaced by one consisting of halves from two different males but never both from the same male, this implies that a complex decision process is taking place. These observations also imply that chromosomal material missing from one sperm cell is selected from other sperm cells. Clearly we need more research of all of these matters.

I have looked at the research behind the references in Wikipedia. Whilst there is clear evidence that sperm blocking occurs, there is no evidence in any of the research that indicates whether the blocking occurs after only one sperm has entered the cytoplasm, or if it occurs after the ovum has received a sufficiency of genetic material, (perhaps from several sperms), to satisfy the fertilisation requirements of the ovum. It would have been better if the tests had been performed using a mixture of limited numbers of sperms from males with identifiably different genetic characteristics to determine more clearly whether polyspermy had occurred.

My informants from these industries all require that I do not identify them. All have contracts of employment that include strict confidentiality clauses, and evidence of these disclosures could compromise their employment status and their future careers. Each of the observations quoted here derive independently from multiple individuals in different companies.

I realise that there are legal and ethical issues over doing any sort of experimentation with human sperm and ova, but surely, such tests could use other species, with shorter gestation periods, to see whether mixing semen from several genetically distinguishable males would result in viable offspring containing genetic material from multiple fathers. However, it would also be possible to perform research using anonymised samples that have been submitted for paternity verification, and this could be conducted either by researchers working within the industry or via anonymised samples provided by DNA testing organisations and given to research students in universities.

If we accept these observations, then some moral and ethical issues clearly follow. If there is a dispute over paternity, how should the DNA testing services handle a situation where they detect the DNA of two or more possible fathers in the child? Should they take the largest proportion of the chromosome halves and declare that man as the father, (this seems to be the current situation)? As different testing services use different testing methods, is it possible that different service providers could generate different results from the same DNA samples? Do they declare the presence of several fathers and identify which of them sourced each of the chromosomes? Should the courts consider the possibility of multiple fatherhood when deciding custody or support arrangements? Should the courts require testing of all 23 chromosomes, (which could be very expensive), instead of the more usual five or six, for this purpose? Would a man feel differently about providing support for a child if he knew that the child possessed some of his genetic material, (albeit that the majority came from one or more other men), than he now feels having been given the erroneous impression that the child had none of his genetic material?

From the child's point of view, I would expect that he or she would want some sort of relationship with or understanding about each of the contributing fathers. Providing complete information could make a significant difference in divorce, support or custody disputes, as well as in the medical investigation of inherited genetic conditions. It could

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also make a huge difference at birthday and Christmas celebrations if each of the contributing fathers were providing gifts.

Following such an investigation, whose name should appear on the birth certificate as the father? Should birth certificate legislation and forms enable the identification of multiple contributing fathers? Should the possibility of multiple fatherhood be recorded at first registration, or should the records be updated as new DNA testing evidence becomes available?

One possible outcome of such research is that some couples could find that IVF would be more likely to be successful with the admixture of semen from another donor male, perhaps a brother or cousin of the male partner or perhaps from multiple anonymous donors. Or perhaps couples experiencing fertilisation difficulty could avoid the complex and traumatic medical attention associated with IVF by ensuring that sperm from multiple males was present in the woman's abdominal cavity at the time of ovulation. My own statistical analysis suggests that fertilisation success rates could go up from the present 80-83% to around 95% by having sperms from multiple males available for fertilisation. Many couples considering IVF might welcome this opportunity.

My purpose in writing this article is to encourage much more research into the mechanisms of fertilisation, and, in particular, research into polyspermy: the possibility of sperm from more than one male fertilising an ovum.

Reference: https://en.wikipedia.org/wiki/Polyspermy

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