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# Incest by father or by brother? A case report

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**Abstract.** In a newborn who died 5 days after birth, a rare mutation for the cystic fibrosis gene was found, allowing the clinicians to suspect that the child was a product of an incest. A forensic genetic analysis on the newborn, on the girl and her parents was very suggestive for the incest hypothesis. The girl's father was suspected, but an exclusion at two loci was found. Using the software for genetic analysis "Familias", considering different hypothesis, the most probable situation was the existence of a girl's brother. This hypothesis allowed the Prosecutor to discover the existence of a girl's brother, who admitted the crime later. © 2005 Published by Elsevier B.V.

*Keywords:* Incest; Mutation; Genetic software

## 1. Introduction

Ten years ago, a 16-year-old girl gave birth to a child who died 5 days later in the hospital. The girl reported to the Prosecutor that she was raped by a schoolmate.

The molecular analysis that identify cystic fibrosis mutations in the child, as a screening performed in all newborns in Italy, allowed to identify the mutation N1303K. This mutation is quite rare in Italy (4.4% of all mutations regarding this disease) so the clinicians suspected that the child's father could be a member of the girl's family [1]. In fact, the analysis performed on the girl's father confirmed the presence of the same mutation.

The Prosecutor asked a genetic analysis on the dead child, on the girl and on her father and mother. At the investigation time, only traditional markers such as DQalpha, D1S80,

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LDLR, GYPA, HBGG, D7S8, GC, TPOX, F13A01, AR, APOB were investigated. Some years later, a genetic profile was obtained using the commercial kit Profiler Plus (Applera, Foster City, CA, USA).

## 2. Materials and methods

DNA was obtained from the child's whole blood collected during autopsy and from the whole blood of the girl, her father and her mother. DNA was extracted using phenol/chloroform method. The amplification of the VNTR was performed according to the protocols present in the literature and the amplification for the Profiler Plus Kit was performed according to manufacturer's recommendations in a GeneAmp PCR System 2400 (PE).

## 3. Results and discussion

All markers investigated were consistent with a relationship father/girl except for the APOB and D8S1179 loci (Table 1). A research in the literature regarding the mutation rate at these loci showed no relevant values, above all for D8S1179 [2–6]. So two contrasting hypotheses were considered and tested through the genetic software "Familias" [7]: (A) girl's father vs. unrelated, including mutations and (B) girl's father vs. girl's hypothetical brother, including mutations. For the mutation rate considered, regarding the first hypothesis, a posterior probability value of 0 was obtained alleging the girl's father as the child's father, in contrast to a probability value of 0.000034 alleging an unrelated as the child's father. Introducing in the pedigree an untyped girl's full brother, a probability value of 0.8096 was obtained for this untyped man as the child's father. These results were very suggestive

Table 1
Genotypes

| Locus | Child | Mother | Grandfather | Grandmother |
|---|---|---|---|---|
| DQalfa | 1.2–1.3 | 1.2–4.1 | 1.3–4.1 | 1.1–1.2 |
| D1S80 | 18–24 | 18–24 | 24–24 | 18–18 |
| LDLR | A | A | AB | AB |
| GYPA | B | AB | B | AB |
| HBGG | AB | AB | B | A |
| D7S8 | B | B | AB | AB |
| GC | BC | B | BC | AB |
| TPOX | 8–11 | 8–11 | 11–11 | 8–8 |
| F13A01 | 7–7 | 7–7 | 5–7 | 6–7 |
| AR | 31–21 | 31–21 | 21–21 | 31–20 |
| APOB | 35–37 | 37–37 | 37–37 | 35–37 |
| D3S1358 | 14–15 | 14–15 | 14–14 | 15–18 |
| vWA | 19–19 | 19–19 | 16–19 | 16–19 |
| FGA | 21–21 | 21–23 | 21–22 | 20–23 |
| D8S1179 | 13–13 | 12–13 | 12–14 | 13–14 |
| D21S11 | 29–29 | 29–30 | 29–30 | 29–30 |
| D18S51 | 12–14 | 12–14 | 12–12 | 14–16 |
| D5S818 | 9–9 | 9–13 | 9–11 | 12–13 |
| D13S317 | 11–11 | 11–12 | 11–11 | 12–13 |
| D7S820 | 11–12 | 11–12 | 8–11 | 12–12 |

for the existence of a girl's brother as the child's father. This hypothesis allowed the Prosecutor to discover the existence of a girl's brother, who admitted the crime later.

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