

Further suppose that the firstborn of the said siblings inherited “A,” while the second might have inherited the same “A” or different “a.” If the second also inherited “A,” then looking only at this point, the gene concordance ratio of these full-siblings is 100.

At any rate, because respective genes on the father’s and mother’s chromosomes, e.g. genes “B” and “b,” genes “C” and “c,” genes “D” and “d,” and so on, are selected and inherited in this manner, the result is that the gene concordance ratio in full-siblings or fraternal twins approaches 50% as closely as possible. This is the same principle how the probability of flipping a coin and getting heads approaches 50% the more time you flip it (known in statistics as “regression toward the mean”).

Even in full-siblings, half will be different. Even a single gene difference can result in an individual with entirely different characteristics, and possessing just one malignant gene can be fatal.

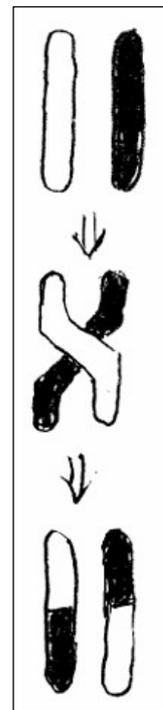
Imagine the domino toppling. Suppose that you meticulously set up a vast number of dominoes. Nevertheless, if just one domino is placed incorrectly, the dominoes behind it will not fall, resulting in a complete failure. Similarly, if you accidentally knock over just one domino before starting, all the dominoes behind it will fall, also resulting in a complete failure. This is the same as how just one harmful gene can cause the body to malfunction (become diseased). Chromosomes exist in pairs, but when germ cells that will become sperms or eggs are formed, chromosomes cross over with each other as shown in Chart 53, and as a result, the newly formed chromosomes enter those germ cells. After crossing over, chromosomes with a new “gene lineup” are passed on to offspring. This process is called “recombination.”

Humans have 46 chromosomes. However, when sperms are produced in males and eggs are produced in females, the paired chromosomes separate from each other. This means their number is halved, and 23 chromosomes are inserted into each sperm and egg. Each of these 23 pairs is randomly inserted into each sperm or egg, so that even among a single man’s sperms, each of them contains a unique combination of chromosomes. The number of possible combinations is 2 to the 23rd power, exceeding 8 million.

Moreover, the phenomenon of recombination occurs randomly and is distributed to each individual sperm and egg. Consequently, even among the sperms of the same man, the genetic makeup of each one is entirely different.

This means that while the gene concordance ratio in full-siblings (excluding identical twins) is approximately 50%, they are born with completely different combinations of genes.

(Chart 53)



### **3.7 Widespread Misunderstanding**

Now, let’s consider the differences among these full-brothers becoming sires, Black Tide, Deep Impact and On Fire, and also those, Dream Journey, Orfevre and Lien de Famille. Nobody would think, “Because they are full-siblings, their stud fees should be the same, right?”

Incidentally, Dream Journey and Lien de Famille are bay, while Orfevre is chestnut. In the Stay Gold and Oriental Art mating, the ratio of foals being bay or chestnut should be 1:1 according to Mendel’s Law of Segregation. It goes without saying that which coat color gene each individual receives differs even among full-siblings, just like flipping a coin where heads and tails both appear.

Again, Real Steel and Loves Only You are full-siblings, but they are different sexes. This is because they inherited different genetic combinations. Accordingly, you can see that any discourse using symbols like “=” or “≐” between full-siblings is completely out of the question.

You may hear the term “pedigree purist.” This primarily refers to the racing fans or the like who place heavy emphasis on pedigree when predicting race outcomes. I believe the purists fall into several traps, and the full-sibling discussion above is a classic example. The full-siblings appear identical on the pedigree chart. Because only what is on that chart serves as the basis, it becomes impossible for them to discuss the differences stemming from anything beyond that.

I also frequently see discourse using the term “same blood,” and I believe the authors of such discourse are almost always caught in a similar trap themselves, luring their readers into it as well.

This past March, Satono Reinas, who narrowly lost to Sodashi in the 2020 Hanshin Juvenile Fillies