

# The East Flanders Prospective Twin Survey

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The East Flanders Prospective Twin Survey, started in 1964, realised for the first time a population-based register of all multiple births in the Belgian Province of East Flanders, characterized by the systematic examination of the placenta and the accurate determination of zygosity based on blood groups, DNA and structure of fetal membranes. For decades, it has been the only register to include chorionicity in same-sex pairs of twins, an irreplaceable tool allowing almost certain diagnosis of monozygosity and the timing of the division of the zygote in monozygotic twins. We showed that twins and triplets are far from being an homogenised group and demonstrated differences between these groups important enough to introduce these variables in the standard methodology of twin research. Examples are: Weinberg rule, sex ratio and duration of gestation.

The East Flanders Prospective Twin Survey (EFPTS) was established in July 1964 with the collaboration of all gynecologists of the province of East Flanders. In itself it initiated the first scientific project in which all members of the Flemish Society of Obstetrics and Gynecology were involved. The aim was to systematically examine the placenta and determine zygosity. This step involved the determination of chorionicity, which at that time was a unique aspect of the registry. For decades we were the only ones to realize the importance of chorionicity, because the placental structure is the only and unique way to establish the time of splitting in monozygotic twins. In addition it allows the diagnosis of zygosity in approximately one third of same-sex pairs of twins and triplets.

The basic obstetric data collected in the population-based register allowed us to solve some debatable aspects of multiple births that are listed below.

- The validity of the Weinberg rule. In some 5000 pairs of spontaneous dizygotic (DZ) twins the number of same-sex and opposite-sex pairs were the same but a fraction of 1%. In 1500 iatrogenic DZ pairs the two numbers were identical. There are no reasons, therefore, to question the validity of the rule (Derom & Derom, 2007a).
- In higher order multiple births, the sex ratio decreases as the number of fetus increases. The



**Figure 1**

East Flanders Prospective Twin Survey.

higher numbers of girls is entirely due to the monozygotic babies (Derom & Derom, 2007b).

- Using the method of Teplica to diagnose mirror-image twins, its prevalence of 20% has been confirmed (Teplica & Peekna, 2005).
- There are essential differences in twins according to zygosity and chorionicity. To treat twins as a homogenous group may be considered as a bias.
- Segregation analysis of some 1500 3-generation families from the the 'Nederlandse' and the 'Oost-Vlaamse Tweelingen Registers' of at least two DZ twin pair, shows that the phenotype of having DZ twins is consistent with an autosomal monogenic dominant model, with a gene frequency of 0.035 and a female-specific life time penetrance of 0.01 (Meulemans, et al., 1996).

Instead of listing all our publications, we choose to limit the overview of our production to six cardinal articles on the biology of twinning, an aspect that could be of interest to many members of The International Society for Twin Studies (ISTS).

The first article refers to the origin of the launching of the registry. The findings were unexpected and the origin of my interest in twins. The results show

that in normal delivery, the second-born twin experiences a slight degree of oxygen debt, which has no clinical importance. It is the oxygen debt anyone would make by running 30 meters.

Ruth Loos et al. discover that the female twin favorably influences the duration of pregnancy. Who is the beneficiary? — the male co-twin. *Girls call the tune* is reflected in the title of her article.

Is the sex ratio of twins different from that of singletons? Catherine Derom et al. show that one must consider zygosity to draw a conclusion. The answer is no for dizygotic twins, but yes for monozygotic twins and varies according to the time of the splitting of the embryo. Another remarkable phenomenon in monozygotic pairs is the discordance of X-inactivation after division but almost equal in intermediate and perfectly equal in late splitting.

Nele Jacobs et al. have the courage to approach subject number one in behavior genetics, the inheritance of intelligence. They focused on the effect of chorion type on the heritability of IQ in children and the causes of association between child psychopathology and lower cognitive ability.

Gaston Beunen and his team are interested in the genetic determination of physical performance. They identified the genetic and environmental determinants (nature versus nurture) of somatic dimensions, body composition, physical activity and fitness and especially their growth and developmental patterns.

Marieke Wichers et al. take on 'the genetics of emotional experience in relation to depression'. They

demonstrate that increased stress-sensitivity, that is, responding with increased negative affect towards small daily life stressors, is a genetic risk factor for depression. However, subjects that are genetically at risk of depression are able to neutralize their vulnerability by the ability to experience positive affect.

Ilse Delbaere and her colleagues address the risks associated with artificial reproductive technology (ART). Their approach to the methodology of comparing spontaneous twins with ART twins, frequently biased, may be considered as a model.

## References

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