Parental genes do what's best for baby

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A molecular "battle of the sexes" long considered the major driving force in a baby's development is being challenged by a new genetic theory of parental teamwork.

Biologists at The University of Manchester say the prevailing view that maternal and paternal genes compete for supremacy in their unborn offspring fails to answer some important questions relating to child development.

In fact, rather than a parental power struggle, the researchers suggest that certain offspring characteristics can only be explained by their theory of genetic cooperation.

“When we are conceived we inherit two copies of every gene – one set from our mother and one from our father,” explained Dr Jason Wolf, who led the research in Manchester’s Faculty of Life Sciences.

“But some genes – through a process called genomic imprinting – only use one parent’s copy; the spare copy from the other parent is silenced by a chemical stamp.”

The concept of imprinting has long puzzled scientists as it appears to undermine the natural benefits organisms gain from inheriting two sets of genes.

If one copy of a gene is damaged, for instance, then the second copy can compensate; imprinted genes lose this safeguard and so are more

susceptible to disease. Errors in imprinting have also been linked to cancer and other genetic disorders.

Scientists have argued that the reason some genes only use or 'express' one copy is due to a conflict between paternal and maternal interests.

In the natural world, for example, males would hope to produce large offspring to give them the best chance of survival and carry on their gene line. But large offspring require greater maternal investment, so females will try to impose their genetic stamp so that smaller young are born.

"The idea that imprinting evolves because of conflict between males and females over maternal investment in their offspring has become a generally accepted truth that has remained largely unchallenged," said Dr Wolf.

"But we have shown that selection for positive interactions between mothers and their offspring, rather than conflict, can produce the sorts of imprinting patterns we see for a lot of genes.

"For example, during placental development the maternal and offspring genomes have to work together to produce a functional placenta. By expressing the genes they get from their mothers, the offspring are more likely to show an adaptive fit with their mother's genes; they complement each other and so work better together to produce the placenta."

Source: University of Manchester