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Why was it that one story received so much more attention than the other? Was it that opponents of so-called genetically modified food (of who the loudest are frequently connected to the organic food movement) pushed and promoted the story for their own cause? After all, if conventional foods are deemed safe for people and the environment, then in the absence of a media flurry, why would consumers pay more for hypothetical benefits?

The same media forces that propelled Pusztai’s rats to mainstream conversation have been largely silent when it comes to the rotenone rats. Since the organic movement uses rotenone itself, maybe they are choosing to remain quiet on this issue. Surely this action (or lack thereof) brings to light a severe case of double standards. For example, we have yet to see this press release condemning organic farmers for using rotenone and demanding the immediate removal of the roughly 680 rotenone-containing products from the supermarket shelves.

The latest findings about rotenone, which like Pusztai’s results draw attention to the need for “further scientific attention”, underscores a fundamental approach that North American regulators have taken to various products, including genetically-engineered foods: that is, that nature is not benign, and irrespective of the process used to create new foods—be it genetic engineering, conventional breeding, and a whole host of powerful techniques in between, the end product needs to undergo scientifically valid safety assessments.

The natural does not automatically mean safe. This premise proves the point made by Richard Horton that “What matters is what people believe about (these) risks and why the hold those beliefs”.1


Prenatal identification of fetal genetic traits

Sir—Hiroshi Saito and colleagues (Sept 30, p 1170) describe the prenatal diagnosis of a single-gene disorder without clinical consequences in late pregnancy (fetal achondroplasia) by measurement of extracellular fetal DNA in maternal plasma. This report has once again raised hopes that reliable non-invasive prenatal investigation for fetal genetic loci has made the transition from the laboratory to the clinical arena. We caution, however, the premature introduction of this method into practice.

The basis for the approach originates from the observation made by Lo and colleagues2 that free fetal DNA can be detected by PCR in maternal plasma or serum samples. Since fetal and maternal-free DNA are present in the maternal circulation, previous studies have focused on the detection of fetal loci not present in the maternal genome, such as the Y chromosome or the rhesus D gene in rhesus d pregnant women.3

Fetal DNA sequences are more readily detected in second and third trimester maternal blood samples than in those obtained early in pregnancy.4 Diagnosis should, however, be confirmed by an independent test, such as ultrasonography, as Saito and colleagues used, because serious consequences, including termination, might depend on the in-utero findings.

To test the diagnostic accuracy and feasibility of Saito and colleagues’ approach, we did a large-scale study of more than 200 samples. We used a highly sensitive real-time PCR technique, which proved suitable for the detection of free fetal loci.5 Furthermore, since this technology is more amenable to automation and not as prone to contamination as is conventional PCR, it is therefore better suited for routine applications.

We have chosen to focus on the fetal rhesus D gene, which would be useful for diagnosis in pregnancies with a rhesus constellation, and on fetal sex, which is important to know in pregnancies at risk for X-linked disorders. In our experimental validation, done on plasma samples obtained from 22 normal healthy men and 48 non-pregnant women, no false results were recorded. The PCR assay for the rhesus D gene detected no anomalous result in plasma samples obtained from 24 rhesus d or 27 rhesus D individuals. In 11 (6%) of 185 instances, however, in which the fetus was male, no male free fetal DNA was detectable by the real-time PCR assay specific for the Y chromosome. All 52 samples obtained from pregnancies with female fetuses were identified correctly. The assay for the rhesus D gene could detect fetal rhesus D genotype correctly in 24 (96%) of 25 instances. In two (22%) of the nine pregnancies with a rhesus d fetus the fetus was incorrectly genotyped as being rhesus D.

The frequency of false-negative results for the two assays was close to 5%. Although free fetal DNA is less prevalent early in pregnancy than in the late second or third trimesters, our result cannot be attributed to this factor, since we took samples at 11–5–34–6 weeks’ gestation (median of 16–5). In addition, some samples with no detectable concentrations of free fetal DNA had abundant quantities of free maternal DNA on PCR for the rhesus D gene.

Surely this action (or lack thereof) probably arose because of a technical deficit such as the inability to extract free DNA from the sample in question. The two false-positive results arise in this way.

Our data suggest that, even though the assay is specific, because of the poor sensitivity (95%), the use of free fetal DNA from maternal plasma is currently not suitable for routine prenatal diagnosis of fetal genetic traits in a clinical setting, even with use of the most advanced methods currently available.

Xiao Yan Zhong, Sinuhe Hahn,* Wolfgang Holzgreve
Department of Obstetrics and Gynaecology, University of Basel, CH-4031 Basel, Switzerland (e-mail: wholzgreve@uhbs.ch)


* Shane Morris, Doug Powell
Department of Plant Agriculture, Crop Science Building, University of Guelph, Guelph, Ontario N1G 2W1, Canada