in obese than nonobese individuals. Although it has been shown that many of these abnormalities improve following weight loss, Löfgren and colleagues aimed with this study to clarify whether adipocyte number, size and metabolism could normalize completely.

In this prospective, case–control study, obese women with a mean BMI of 43 kg/m^2 (range 31–50 kg/m^2) underwent analysis of adipocyte metabolism after weight loss achieved by either adjustable vertical gastric banding ($n=18$) or lifestyle modification ($n=7$). After weight loss, each patient was matched by BMI (mean 32 kg/m^2) and age to a healthy control subject.

Adipocyte volume ($P=0.0002$) and basal rate of lipolysis ($P=0.01$) were lower in cases than in controls. Percentage body fat was similar for the two groups, implying that cases had a larger number of smaller adipocytes, which had a lower lipolytic rate. Sensitivity to insulin and lipogenesis were also similar between cases and controls, indicating normalization.

It is not possible to determine from this study whether adipose-tissue hyperplasia and reduced lipolysis result from or contribute to obesity; however, the authors conclude that insulin resistance is secondary to obesity and is, fortunately, reversible by weight loss.

Rebecca Doherty

Original article Löfgren P *et al.* (2005) Prospective and controlled studies of the actions of insulin and catecholamine in fat cells of obese women following weight reduction. *Diabetologia* **48:** 2334–2342

Meta-analysis demonstrates benefit of lifestyle education for prevention of type 2 diabetes

Type 2 diabetes is increasingly common and causes significant morbidity and reduction in quality of life. Prevention of this disease is, therefore, highly desirable. A Japanese team has conducted the first meta-analysis of the impact of lifestyle education (i.e. diet and exercise) on risk of type 2 diabetes (determined by 2 h plasma glucose and disease incidence).

The meta-analysis included eight randomized, controlled trials with a follow-up period ≥6 months that were identified via MEDLINE and the Educational Resources Information Center database. All patients within the trials ($n=2,026$) were at high risk of diabetes and received lifestyle, or solely dietary, intervention.

According to a RANDOM-EFFECTS MODEL, the mean 2 h plasma glucose levels in patients who received 1 year of lifestyle intervention were 0.84 mM lower in patients than in control subjects (95% CI 0.39–1.29). The incidence of type 2 diabetes in those receiving lifestyle education was approximately half that of controls (relative risk = 0.55; 95% CI 0.44–0.69). Similar trends were seen when a range of statistical models were used, and when other subsets of patients (e.g. those receiving treatment for >1 year) were analyzed.

Although confined to English-language articles, a factor the authors suggest might introduce bias, this study provides important evidence of benefit and highlights the importance of lifestyle education for the prevention of type 2 diabetes.

Rebecca Doherty

Original article Yamaoka K and Tango T (2005) Efficacy of lifestyle education to prevent type 2 diabetes: a meta-analysis of randomized controlled trials. *Diabetes Care* **28:** 2780–2786

New DNA methylation markers for the diagnosis of thyroid cancer

The presence of methylated DNA in serum is associated with several human cancers. As methylated DNA is stable in serum, and levels can be assessed accurately using REAL-TIME QUANTITATIVE METHYLATION-SPECIFIC POLYMERASE CHAIN REACTION, Hu *et al.* aimed to identify a panel of genes that are methylated in thyroid cancer, and to define the sensitivity and specificity of such markers for thyroid-cancer diagnosis and detection of recurrence.

The authors selected the genes (*CALCA, CDH1, TIMP3, DAPK1* and *RARB*) that show the highest levels of methylation in serum from patients with thyroid cancer, and retrospectively defined a threshold value to distinguish positive from negative results. The test was considered to be positive for methylation if at least one gene was positive.

The sensitivity (68%) and specificity (95%) of this panel for diagnosing thyroid cancer were assessed in serum samples from 57 patients with thyroid nodules. Diagnostic accuracy was 77% in the overall analysis, and 80% in a subset of 15 patients who had cytologically indeterminate results.

GLOSSARY
RANDOM-EFFECTS MODEL
A statistical model sometimes used in meta-analysis; incorporates both within-subject and between-subject variance to estimate the combined treatment effect size

REAL-TIME QUANTITATIVE METHYLATION-SPECIFIC POLYMERASE CHAIN REACTION
Assay that enables quantitative assessment of the methylation levels of candidate genes