Because of the increasing prevalence of obesity there are ever more weight-loss programmes. Independently of such programmes it is well known that there are considerable variations in weight loss under the same standardized conditions. Recent studies provide first evidence that a genetic background could be partly responsible for these variations. Significant associations were shown between specific gene variants and weight loss. However, data are inconsistent and many studies have methodological limitations. Although the genetic background may influence weight loss, items such as compliance and life-style may play a greater role. Thus the current knowledge about genetic determinants of weight loss has as yet no clinical relevance. However, the identification of gene effects could contribute to offering personalized treatment of obesity and thus achieving greater weight loss.