models. Similar Cox models were used to fit the 4-year risk of CVD in 7168 participants without previous CVD. The applicability was tested on the same sample and another dataset. A total of 473 major cardiovascular events were recorded. Age at diagnosis, known duration of diabetes, sex, pulse pressure, treated hypertension, atrial fibrillation, retinopathy, HbA1c, urinary albumin/creatinine ratio and non-HDL cholesterol at baseline were significant predictors of cardiovascular events. The model developed using these predictors displayed an acceptable discrimination (c-statistic: 0.70). The external applicability of the model was tested on an independent cohort of individuals with type 2 diabetes, where similar discrimination was demonstrated. We concluded that major cardiovascular events in real populations with type 2 diabetes can be predicted on the basis of routinely measured clinical and biological items. The model presented can be used to quantify risk in people with diabetes. The interests and limits for such a model still need to be challenged according to changing and increasing knowledge of type 2 diabetes and its complications.

ISP11: What is behind the cardiovascular residual risk?

Paul Valensi, Department of Endocrinology Diabetology Nutrition, Jean Verdier hospital, Paris Nord University, CRNH-IdF, Bondy, France

Tight control of blood glucose, lipids and blood pressure is clearly shown to be effective in the prevention of cardiovascular events in diabetic patients. As shown in the Steno-2 study a 50% reduction may be obtained in type 2 diabetic patients using a multifactorial approach targeting all these factors while all the goals were not achieved. This intensive approach which is not always easy or safe lets a substantial residual risk which requires other therapeutic approaches.

High triglycerides with low HDL-cholesterol levels are often neglected while they may increase the cardiovascular risk as shown in the ACCORD LIPID study. Targeting these lipid alterations once the LDL-cholesterol goal is achieved should attenuate the residual risk.

Ankle brachial index, intima-media thickness, artery stiffness or BNP may be considered as useful markers which bring a predictive value additional to the usual risk estimate.

Some diabetic complications including silent coronary artery disease and cardiac autonomic neuropathy are significant predictors of major cardiac events. Their predictive value is additional to routine risk factors. These complications may therefore partly account for the residual risk. For instance silent myocardial ischemia and silent coronary disease remain associated with an increased risk in patients fairly controlled for the usual risk factors.

The detection of such cardiovascular disorders may help to estimate more accurately the risk in particular in patients considered at intermediary risk. This should encourage to assess diabetic patients for these disorders but to do so once the predefined individual goals for blood glucose, LDL-cholesterol and blood pressure are achieved, and may lead to intensify the treatments and to apply specific additional tailored therapeutic approaches. However the cost-effectiveness of this strategy needs to be evaluated.

ISP12: Role of postprandial hyperglycemia and glycemic variability

A. Ceriello, Institut d’Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Barcelona, Spain

Large randomized studies have established that early intensive glycemic control reduces the risk of diabetic complications, both micro and macrovascular. However, epidemiological and prospective data support a long-term influence of early metabolic control on clinical outcomes. This phenomenon has recently been defined as “Metabolic Memory.” Furthermore, evidences suggest that both “Postprandial Hyperglycemia” and “Glucose Variability” may also be independent risk factors for cardiovascular complications in diabetes. Studies suggest that all these different situations of hyperglycemia share a common pathogenetic mechanism, increased oxidative stress, producing endothelial dysfunction. The therapeutic challenge deriving from these evidences is a need not only for an early tight glycemic control, but also for maintaining glycemia always in a strict normal narrow range.

ISP13: Advanced glycation endproducts in food and medicine

C. G. Schalkwijk, Maastricht University Medical Centre, Maastricht, the Netherlands

Dietary factors can modulate inflammation and endothelial function which are closely associated with the development of vascular complications. Therefore, medical nutrition therapy plays an important role in the management of vascular complications. Among other factors, advanced glycation endproducts (AGEs) in food are potential risk factors for inflammation and vascular complications, especially in patients with impaired renal function. Maillard products are formed during processing of food, and become incorporated in body components after intestinal absorption. It has now become apparent from animal models that dietary AGEs represent a significant source of circulating and tissue AGEs. Although only a minor part of ingested AGEs are absorbed and deposited in tissues, they may manifest pathological effects similar to their endogenous counterparts. Experiments performed in animal models have indicated a significant role for dietary AGEs in inducing insulin resistance atherosclerosis and impaired wound healing. In a group of diabetic subjects, dietary AGE was associated with increased levels of serum AGEs in parallel with impaired flow mediated dilation and increased serum markers of inflammation as well as markers of endothelial dysfunction. However, since high-AGE containing diets were produced by cooking, these data doesn’t directly implicate that AGEs are doing the damage. The biological effects may be due to other components as induced by cooking. Taken together, these data are suggestive, but not conclusive, for a role for dietary AGEs in inducing inflammation, insulin resistance and vascular dysfunction.

Notwithstanding these comments, the above mentioned important studies indicate a relationship between dietary AGEs and postprandial levels of AGEs. Whether the uptake of AGEs from the diet has biological consequences for inflammatory activity, vascular function and insulin resistance deserves further investigation.

ISP14: Exercise, sympatho-vagal balance and postprandial glucose profile

D. Chapelot, Université Paris 13, Sorbonne Paris Cité, Bobigny, France

There is now a general agreement for considering that postprandial hyperglycemia (PPHG) is a major and independent risk factor of cardiovascular diseases and should be a specific target of type 2 diabetes (T2D) therapy. The benefit of exercise on insulin-sensitivity, not only after training but also after a single session, has received a convincing experimental support. However, its effect on PPHG is still debated. Moreover, an apparently paradoxical impaired glucose