Low-glycaemic-index carbohydrates and, to a lesser extent, low-protein intake may specifically reduce low-grade inflammation and associated comorbidities in overweight/obese adults,” concludes an article in Circulation in December 2011 titled “Effects of Weight Loss and Long-Term Weight Maintenance with Diets Varying in Protein and Glycaemic Index on Cardiovascular Risk Factors: The Diet, Obesity, and Genes (DiOGenes) Study: A Randomized, Controlled Trial.”1

The last author of this article, Andreas Pfeiffer, MD, professor of diabetes and endocrinology, Department of Endocrinology, Diabetes, and Nutrition, Charité University Hospital Berlin and German Institute of Human Nutrition Potsdam-Rehbruecke, Germany, says, “Metabolic research is making great progress in many aspects. An important development that interests me relates to the immediate posttranslational nutrient-induced modification of metabolic pathways by acetylation, phosphorylation, sumoylation, and other modifications. The inflammatory pathways of cytokines, the Toll-like receptor innate immunity systems, and the nucleotide-binding domain and leucine-rich repeat containing protein 3 (NLRP3) inflammasome pathways and their relation to fatty acids and cellular signalling systems are becoming much clearer. Similarly, tremendous progress has been made in understanding hormonal satiety systems and their hypothalamic integration. The metabolomics, transcriptomics, proteomics, epigenomics, and genomics technologies provide the means to discover a more integrated picture, allowing better understanding of the highly integrated networks of physiology and they will be applied to the individual for diagnostic means.”

Professor Pfeiffer’s most important research falls into 4 categories: first, inflammation and metabolic syndrome with regulation of inflammatory responses by food and their role in type 2 diabetes mellitus and cardiovascular disease;1–3 second, the role of food components (insoluble fibre, types of protein, micronutrients) in regulating metabolism and hormones to alter risks of metabolic diseases, specifically type 2 diabetes mellitus and...
Professor Pfeiffer with his wife Doris, a reader in gynaecology and practicing gynaecologist; daughter Susanne, who is in her final year studying medicine at the University of Leipzig, Leipzig, Germany; and son Max, who has just finished school and is studying bioinformatics. Professor Pfeiffer and his wife have collaborated scientifically on cancers and reproductive endocrinology. Photograph courtesy of Professor Pfeiffer.

cardiovascular disease; third, the role of growth factors in proliferative diseases of the gastrointestinal tract and proliferative diabetic retinopathy; and fourth, identification of opioid receptors and their function in humans.

“For We Are Attempting to Identify Helpful Nutrient Components to Replace Some of the More Detrimental Foods Combined with Individualised Understanding”

Professor Pfeiffer studied medicine in Germany (at Kiel and Freiburg) and France (at Montpellier). He then obtained his habilitation and venia legendi (permission for lecturing) at Ludwig Maximilians University, Munich, Germany.

Professor Pfeiffer’s research career started at the Max Planck Institute for Psychiatry in Munich and continued at the National Institute of Mental Health, Bethesda, MD, with Irwin Kopin, MD. Professor Pfeiffer then returned to Munich as an intern in endocrinology and gastroenterology at the University Hospital of Ludwig Maximilians University while maintaining a lab at the Max Planck Institute for Psychiatry in Martinsried near Munich. This led to his current research in endocrinology and diabetes mellitus. Professor Pfeiffer recalls, “The heads of the departments accepted that I had my own research group and did not intervene in my research projects in detail, but rather asked me to fit in with their general topics in the departments. This led to the changes in my general fields of work and articles.”

Professor Pfeiffer’s clinical chiefs were both Austrian. Professor Gustav Paumgartner, MD, in Munich, an “extraordinarily clear and well organised clinical scientist,” was a widely known and renowned hepatologist. Professor Helmut Schatz, MD, at the University in Bochum, Bochum, Germany, “was an outstanding clinician and highly respected endocrinologist.” Professor Pfeiffer says, “He was my most important teacher in endocrinology and diabetes. He was also an excellent politician and introduced me to the concept of ‘clinical and scientific diplomacy.’”

Professor Pfeiffer adds, “The person with the greatest impact on my ambitions, however, was my father, a professor of endocrinology in Germany and chair of the department at the University in Ulm. He had been at the Joslin Diabetes Centre, Boston, MA, from 1958 to 1960 as a Fulbright Fellow, together with Albert Renold, MD, and others. Rachmiel Levine, MD, Jesse Roth, MD, and many others were visitors to our home, so as a young boy I became quite familiar with friendly people in science. In a way, I never really doubted that this was what I should do in my life.

“The most memorable moment of my career was probably when I received a call offering a full professorship at the Free University in Berlin, now Charité University Medicine Berlin, combined with the position of head of Department of Clinical Nutrition at a Leibnitz Institute (1 of the 3 State and Land-financed extra-university research organisations, together with Max Planck Institutes and Helmholtz Organization Institutes) and the German Institute of Human Nutrition Potsdam-Rehbruecke. This position was ideal for combining research and clinical medicine in Germany and was a goal of my work until then.

“My research has always dealt with receptors, signal transduction, and hormones. At first, from 1979 to 1989, I focused on endogenous opioids and neuroendocrinology, which was an exciting field because Roger Guillemin and Andrew Schally had recently been awarded the Nobel Prize.” French-born Roger Guillemin of The Salk Institute, San Diego, CA, and Polish-born Andrew V. Schally of Veterans Administration Hospital, New Orleans, LA, were awarded one half of the 1977 Nobel Prize in Physiology or Medicine for their work on peptide hormone production in the brain while the other half was awarded to Rosalyn Yalow, Veterans Administration Hospital, Bronx, NY, for the development of radioimmunoassays of peptide hormones.

Professor Pfeiffer’s research included a study of psychotomimetic effects of kappa opioid receptors, which resembled the effects of lysergic acid diethylamide. This led to an article in Science" in which Professor Pfeiffer and his colleagues clearly separated the actions of this group of opioids, which includes many endogenous peptides, for example, dynorphins. Professor Pfeiffer’s chief at the time, Professor Albert Herz, MD, was not entirely convinced, and insisted on experiencing the kappa opioid compound himself, which gave him what he later described as “an impressive and colourful experience” of psychotomimetic effects antagonised by high-dose naloxone.

“My approach has always been to start from some fascinating idea,” Professor Pfeiffer explains. “My current goal is to develop nutrition that will help combat the diseases of our Western societies related to excessive and unhealthy
food intake. I do not believe that education will change habits population-wide. Therefore, we need foods that are preferred by a wider population and thus highly attractive, palatable, and cheap that help to achieve these goals.”

Professor Pfeiffer says that the objective is to establish a scientific basis of nutrition and to get the large producers of nutritional products interested in offering them in the supermarkets. The primary goals are to identify nutritional components that reduce inflammation, fatty liver, insulin resistance, and, perhaps most importantly, obesity. He explains, “This needs to be based on an understanding of the molecular basis of metabolic networks. Many facets are involved, but there is progress. Our current largest project is called NutriGenomic Analysis in Twins (NUGAT), which provides exciting insights into genetic and epigenetic regulation of inflammation and metabolism. Along the way, we are attempting to identify helpful nutrient components to replace some of the more detrimental foods combined with individualised understanding. If we are successful the societal impact would be to reduce the incidence of metabolic diseases.”

A major source of funding for Professor Pfeiffer’s research since 1979 has been the German Research Foundation, which has provided him with >10 research grants to date, including 3 current projects. The Federal Ministry for Education and Research and, more recently, the Ministry of Food, Agriculture, and Consumer Protection have also provided several large tranches of funding.

Professor Pfeiffer’s personal ambition is to develop and prove the effectiveness and the molecular mechanisms of some food components to specifically and powerfully prevent metabolic disease. He predicts that specific food components will be discovered that achieve beneficial modifications of these metabolic networks and that these can be integrated into our foods, most likely with an individualised approach.
The Swiss Heart Foundation awards a research prize of 20,000 Swiss Francs every year. The prize recognises 1 or more outstanding scientific research articles or accepted articles on the prevention, diagnosis, or treatment of cardiovascular diseases. Swiss researchers and research teams working in Switzerland or abroad and foreign researchers working in Switzerland are eligible to apply. The age limit is 45 years at the time of application. Prize winners are chosen by the scientific committee of the Swiss Heart Foundation.

2012: “The Findings Complete the Picture of Tobacco Exposure Interfering with Cardiovascular Maturation and Health from Gestation to Adulthood”

Giacomo D. Simonetti, MD, specialist in paediatrics and paediatric nephrology and head, Paediatric Nephrology Unit, University Children’s Hospital, Inselspital and University of Bern, Bern, Switzerland, received a Swiss Heart Foundation research prize in 2012 for a study published in Circulation in 2011.1 This research concluded that parental smoking is an independent risk factor for higher blood pressure in healthy preschool children and that implementing smoke-free environments at home and in public places may provide a long-term cardiovascular benefits, even to young children.

Dr Simonetti’s population-based study conducted in the Rhein-Neckar district in southwest Germany was designed to explore endogenous and exogenous determinants of blood pressure in 4236 preschool children, ages 4 to 6 years, whose blood pressure was measured in conjunction with a family health and lifestyle survey. Multifactorial dependency of blood pressure on body stature and familial, prenatal, and environmental influences were observed. Among these factors, exposure to parental smoking was associated with a small but consistent increase in blood pressure, which remained significant when adjusted for numerous potentially collinear anthropometric, medical, and social factors, including prenatal conditions. Childhood blood pressure was quantitatively correlated with the daily cigarette consumption of their mothers only, compatible with closer exposure to maternal smoking at home.

“The findings of this study add an important paediatric perspective to the issue of prevention and containment of active and passive smoking,” says Dr Simonetti. “They complete the picture of tobacco exposure interfering with cardiovascular maturation and health from gestation to adulthood. The benefit of successful primary prevention programmes would most likely not be limited to adults but would extend even to the youngest family members.”

Dr Simonetti’s current research, which he carries out at the University Children’s Hospital, Inselspital and the University of Bern, is focused on cardiovascular risk assessment in children with chronic inflammatory diseases and on the systematic analysis of rare diseases in childhood.

Reference

2011: “Novel Sensitive Cardiac Troponin Assays May Significantly Improve the Early Diagnosis of Acute Myocardial Infarction”

Tobias Reichlin, MD, fellow in cardiology, Division of Cardiology, University Hospital Basel, Basel, Switzerland, and fellow in clinical cardiac electrophysiology, Cardiovascular Division, Brigham and Women’s Hospital, Boston, MA, received the research prize in 2011 for an investigator-initiated multicentre study examining the diagnostic performance of new higher sensitivity cardiac troponin assays in the early diagnosis of acute myocardial infarction. The study was coordinated from the University Hospital Basel under the leadership of principal investigator Professor Christian Mueller, MD, in the Division of Cardiology. Among 718 patients presenting to the Emergency Department, Dr Reichlin and his co-researchers found that 4 novel sensitive cardiac troponin assays from different manufacturers had an excellent diagnostic performance at presentation, and that the novel assays were superior compared with a standard assay. The major limitation of standard troponin assays has been a sensitivity deficit at presentation, so a diagnosis of acute myocardial infarction consequently required prolonged monitoring over 6 to 12 hours and serial blood sampling. Delayed “rule-in” of acute myocardial infarction increases morbidity, and a delayed “rule-out” contributes to overcrowding in the Emergency Department.

“The novel sensitive cardiac troponin assays may significantly improve the early diagnosis of acute myocardial infarction, particularly in patients with recent chest pain onset,” says Dr Reichlin. “Furthermore, a more rapid rule-in and rule-out of acute myocardial infarction has the potential of improving the outcome of patients with acute myocardial infarction and saving time and money in the Emergency Department.”

Since July 2011, Dr Reichlin has been doing a 2-year clinical research fellowship in cardiac electrophysiology at the Brigham and Women’s Hospital in the group of Professor William G. Stevenson, MD. The fellowship is funded by a grant from the Swiss National Science Foundation. Dr Reichlin says, “My current research in Boston focuses on improving catheter ablation therapies and technologies for cardiac arrhythmias, in particular ventricular tachycardia and atrial fibrillation.”

Reference


2011: “These Findings Informed Clinical European Guidelines, Which Now Recommend Restricting Stent Treatment for Symptomatic Carotid Stenosis to Patients <70 Years of Age”

Leo H. Bonati, MD, head, Intermediate Care Stroke Unit, Department of Neurology, University Hospital Basel, Basel, Switzerland, also received the research prize in 2011 for 3 studies comparing the safety and efficacy of endovascular treatment versus endarterectomy for atherosclerotic stenosis of the internal carotid artery. The International Carotid Stenting Study was a large randomised trial comparing stent treatment versus endarterectomy for symptomatic carotid stenosis. It demonstrated similar long-term effectiveness of both procedures in preventing recurrent stroke, but showed an increased risk of periprocedural stroke in the stenting group compared with the endarterectomy group (rate of stroke within 30 days of procedure 7.0% vs. 3.3%). Brain magnetic resonance imaging before and after the randomly assigned treatment was carried out in 231 of these patients. The risk of ischaemic infarction on diffusion-weighted magnetic resonance imaging after the procedure was 50% in the stenting group and 17% in the endarterectomy group, a difference that was highly statistically significant. Dr Bonati says, “The magnetic resonance imaging substudy showed that clinically apparent stroke represents only the ‘tip of the iceberg’ of cerebral ischaemia occurring as a complication of revascularisation, and that many patients, especially with stenting, sustain subclinical embolism during the procedure. Magnetic resonance imaging might therefore be a useful surrogate outcome measure to monitor carotid revascularisation.”

In a second study, Dr Bonati and his co-researchers pooled individual patient data from the International...
Carotid Stenting Study and 2 similar European trials—the Endarterectomy versus Angioplasty in Patients with Symptomatic Severe Carotid Stenosis (EVA-3S) trial and the Stent-Protected Angioplasty versus Carotid Endarterectomy (SPACE) trial—to obtain a large database of 3433 patients with symptomatic carotid stenosis randomly assigned to treatment with stenting or endarterectomy. They found that the increased risk of stroke in the short term associated with stenting was strongly dependent on age. Within the first 120 days after randomisation, there was no difference in the occurrence of death or any stroke between stenting and endarterectomy in patients <70 years of age (5.8% versus 5.7%), whereas in the older age group, the risk was twofold in the stenting group (12.0% versus 5.9%).2 These findings helped in selecting the appropriate revascularisation strategy and informed clinical European guidelines, which now recommend restricting stent treatment for symptomatic carotid stenosis to patients <70 years of age,” says Dr Bonati.

Long-term effectiveness of endovascular treatment and endarterectomy in preventing strokes among patients with mainly symptomatic carotid stenosis was investigated in the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS). Dr Bonati and his co-researchers assessed clinical outcome events as well as the rate of restenosis over a median of 5 years after treatment, up to a maximum of 11 years. There was a nonsignificant increase in risk of ipsilateral stroke among patients treated endovascularly compared with patients treated surgically. However, they observed a threefold increase in the cumulative incidence of severe residual or recurrent stenosis with endovascular treatment over endarterectomy.3 Restenosis was associated with recurrent ipsilateral cerebrovascular ischaemic events when both transient ischaemic attacks and strokes were considered, but it did not increase the risk of stroke alone.

These studies were carried out at the University Hospital Basel and University College London Institute of Neurology, London, England, under the supervision of Professor Martin M. Brown, MD, Stefan Engelter, MD, PhD, and Professor Philippe Lyrer, MD, and in close collaboration with the EVA-3S and SPACE study groups.

Dr Bonati concludes, “My main research focus at present is finding the optimal treatment for patients with asymptomatic or low-to-intermediate risk symptomatic carotid stenosis. For many of these patients, modern medical treatment may obviate the need for invasive revascularisation.” For this purpose, they have recently initiated the 2nd European Carotid Surgery Trial (ECST-2), comparing optimised medical treatment alone versus optimised medical treatment plus revascularisation by carotid endarterectomy or stenting.

**References**


Jennifer Taylor is a freelance medical journalist.