be concluded that priorities have to be set, expectations have to be supported by reliable data, interpretations that are not considered are the true risks of prevention, well-supported theoretical considerations are the cut diamonds of prevention, and practical considerations will unfold from a good theory.

Session 2. Cancer Prevention: The Scientific Base

S4
Genetics in cancer prevention

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Genetics has enabled us to identify individuals at remarkably high risk of specific cancers. Some of this information can be used to distinguish individuals with high cancer risk who can consider cancer risk-reducing interventions too invasive for the rest of the population, including prophylactic surgical removal of organs at risk, and intensified surveillance to direct resection of premalignant lesions. Genetic information can also identify individuals who do not share the increased risk with relatives, and can avoid invasive measures. Epidemiologic data can identify specific exposures that can modify inherited cancer risk. Examples would include the earlier age at onset of lung cancers among Li Fraumeni (p53 mutation) family members who smoke cigarettes, and the reduction in breast cancer risk among BRCA1/2 family members who exercise. One issue is whether the biology of tumors that develop in the setting of inherited susceptibility is different from that of the sporadic cancers of that organ, so that targeted mechanisms of risk reduction cannot be generalized to the larger population. Alternatively, if inherited cancers are more accelerated versions of malignant development along the standard pathway, then study of genetic risk populations should lead to faster development of risk reduction interventions. Examples will be discussed.

S5
Biomarkers for early detection and as surrogate endpoints in cancer prevention trials: issues and opportunities

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In order to improve the early detection and diagnosis of cancer, give more accurate prognoses, stratify individuals by risk, predict response to treatment, and help the transition of basic research into clinical application, biomarkers are needed that accurately represent or predict clinical outcomes. To be useful in trials for chemopreventive agent development, biomarkers must be subject to modulation, easy to obtain and quantify, and have biological meaning, ideally representing steps in well-understood carcinogenic pathways. Though difficult to validate fully, wisely chosen biomarkers in early-phase trials can inform the prioritization of large-scale, long-term trials that measure clinical outcomes. When well-designed, smaller trials using biomarkers as surrogate endpoints should promote faster decisions regarding which targeted preventive agents to pursue, promising greater progress in the personalization of medicine. Biomarkers could become useful in distinguishing indolent from aggressive forms of ductal carcinoma in situ as well as localized invasive breast and prostate cancer, lesions that are often overtreated. Chemopreventive strategies that reduce the progression of early forms of pre-malignancy can benefit patients not only by reducing their risk of cancer and death from cancer but by reducing their need for invasive interventions. Genomic and proteomic methods offer the possibility of revealing new potential markers, especially for diseases whose biology is complex or not well understood. Panels of markers may be used to accommodate the molecular heterogeneity of cancers. Biomarkers in phase 2 prevention trials of combinations of chemopreventive drugs have been used to demonstrate synergistic action of multiple agents, allowing use of lower doses, with less toxicity, a critical feature of interventions intended for cancer prevention.

S6
Targeting polyamines and inflammation for cancer prevention

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Increased polyamine synthesis and inflammation have long been associated with intraepithelial neoplasia, which are risk factors for cancer development in humans (Gerner and Meyskens, Clinical Cancer Research 15: 758–61, 2009). Both experimental and clinical studies suggest that polyamines may be involved in inflammatory processes in several tissues. Genetic epidemiology results indicate that a single nucleotide polymorphism influencing the expression of a polyamine biosynthetic gene is associated with risk of colon and prostate cancers. This genetic variant is also predictive of response to aspirin as a colon adenoma preventive agent. A prospective, randomized, placebo-controlled clinical trial of difluoromethylornithine (DFMO), a selective inhibitor of polyamine synthesis, showed that the one year treatment duration reduced prostate volume and serum prostate-specific antigen (PSA) doubling time in men with a family history of prostate cancer (Simoneau et al Cancer Epidemiology, Biomarkers and Prevention 17: 292–9, 2008). This trial also provided anecdotal evidence for suppression of prostate cancer progression. A second, randomized, placebo-controlled clinical trial of DFMO in combination with sulindac, a nonsteroidal anti-inflammatory drug in patients with prior colon polyps found that the three-year treatment was associated with a 70% reduction of all, and over a 90% reduction of advanced and/or multiple metachronous colon adenomas (Meyskens et al Cancer Prevention Research 1: 32–38, 2008). Treatment-associated toxicities were rare and associated with pre-treatment clinical and genetic risk factors. This latter proof-of-principle trial indicates that targeting polyamine synthesis and inflammation can be an effective strategy for reducing risk factors, such as colon adenomas, that are closely associated with the development of colon cancers in humans. This strategy may be applicable for reduction of risk factors for other human cancers.

S7
Thinking about the role (largely ignored) of heavy metals in cancer prevention: chromium and melanoma as a case in point

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Abstract not available at time of printing.

Session 3. Infection and Cancer Prevention: Hepatitis and *H. pylori*

S8
Hepatitis B virus and cancer prevention

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Chronic infection of a virus of bacteria may closely relate to carcinogenesis. Chronic Hepatitis B virus (HBV) infection can cause liver inflammation, injury and regeneration (chronic hepatitis, liver cirrhosis), and lead to hepatocellular carcinoma (HCC). HBV is the world most common etiologic