ACRYLAMIDE IN FOOD II WORKSHOP 2004
Exposure and Biomarkers Work Group

Maureen L. Storey, PhD
Richard A. Forshee, PhD

Center for Food and Nutrition Policy at Virginia Tech
Important Areas of Progress
Acrylamide Concentration in Foods

- Acrylamide concentration levels for many additional foods have been determined.
- Previously unknown food sources of acrylamide have been discovered (e.g. black olives, prune juice, certain coffee alternatives).
- Ongoing research has improved our understanding of how cooking processes affect acrylamide concentrations in foods, including foods prepared at home.
Exposure Estimates

- Acrylamide concentration data and food consumption data have been used to generate reasonably reliable estimates of acrylamide intake from foods and food groups.
- Various adducts (Hemoglobin, DNA) have been identified as useful biomarkers of acrylamide exposure.
- Ongoing research has improved our understanding of the bioavailability of acrylamide in foods, although many questions remain.
Current Research
Home Preparation

- Wanted to test french fries designed for home preparation
- Deep frying cooking option selected
- Various cooking times and temperatures analyzed
- Discovered that same degree of browning yields same acrylamide levels, regardless of cooking temperature
• Acrylamide levels also reduced with presoaking for at least 15 minutes, pretreating with acidic “wash,” or room temperature storage prior to frying

• Many other factors to consider for future analyses (variety and cut of potato, precooking by manufacturer, type of oil used for frying)
Acrylamide Levels in Toasted Bread

- Higher levels in potato bread than in other varieties
- As in French Fries, level of browning is a good indicator of acrylamide levels
- Can reduce acrylamide levels of toasted bread by 2/3 by scraping toast
Epidemiology

- Epidemiology studies have not found a statistically significant association between acrylamide exposure and risk of cancer.

  However

- Existing epidemiological studies do not have the power to detect cancer risk of acrylamide at the levels suggested by toxicology studies.
Adduct Studies

- Study of acrylamide hemoglobin adducts in NHANES is underway. The results will provide data on acrylamide exposure from all sources for a nationally representative sample.
- Hemoglobin adducts good measure of acrylamide dose received, but not type of exposure; cover about 120 days of exposure.
Research Priorities
Research Priorities

- Food exposure levels, biomarkers and toxicity of acrylamide must be integrated to provide a better understanding of risk assessment, management, and communication
Other Research Priorities

- More data collection of food acrylamide levels needed to strengthen existing data and to examine “specialty” foods (seasonal, ethnic, diabetic)
- More data sharing
  - Internationally
  - Between industry and government
- Applicability of animal studies to humans must be further examined (pure acrylamide dosing vs acrylamide from Maillard Reaction)
THANK YOU