Transdisciplinary Research on Energetics and Cancer

39th Regular Meeting of the Board of Scientific Advisors

Division of Cancer Control and Population Sciences

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Outline

• Overweight, Obesity and Cancer
• Introduction to Transdisciplinary Research on Energetics and Cancer (TREC)
• Mid-course Accomplishments
• Select Research Highlights
  – Dr. Joseph Nadeau, “Diet, metabolism and cancers in mouse models”
  – Dr. Anne McTiernan, “Energy Balance and Cancer: Carcinogenesis and Cancer Survival”

Questions
Obesity Trends Among U.S. Adults, BRFSS 2007
(BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

Source: Behavior Risk Factor Surveillance System CDC
Percentage of U.S. Children and Adolescents Who Were Overweight, NCHS 1963-2004*

*Data for 63-70 are from 63-65 only for ages 6-11 and from 66-70 only for 12-17
Overweight and Obesity Causes Many Health Problems

- Pulmonary
- Cardiovascular
- Gastrointestinal
- Renal
- Endocrine
- CANCER
Overweight and Obesity Causes Many Health Problems

- Postmenopausal obese women have 1.5 times the risk of Breast Cancer than women of a healthy weight.
- Studies have consistently found a link between Renal Cell Carcinoma and obesity in women.
- Obese women have two to four times greater risk of Endometrial Cancer than healthy weight women.
- Overweight and obese individuals are two times more likely than healthy weight people to develop Esophageal Adenocarcinoma; a smaller increase in risk has been found for Gastric Cardia Cancer.
- An increased risk of Colon Cancer has been consistently reported for men with high BMIs.
- An increased risk of Gallbladder Cancer is associated with obesity.

Source: NCI: Obesity and Cancer (cancer.gov)
# Mortality from Select Cancer Sites According to BMI & Gender, Cancer Prevention Study II, 1982–1998

<table>
<thead>
<tr>
<th></th>
<th>Women Relative Risk</th>
<th>Men Relative Risk</th>
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</thead>
<tbody>
<tr>
<td>Uterus (≥40)</td>
<td>6.25</td>
<td>Liver (≥35)</td>
</tr>
<tr>
<td>Kidney (≥40)</td>
<td>4.75</td>
<td>Pancreas (≥35)</td>
</tr>
<tr>
<td>Cervical (≥35)</td>
<td>3.20</td>
<td>Stomach (≥35)</td>
</tr>
<tr>
<td>Pancreas (≥40)</td>
<td>2.76</td>
<td>Esophagus (≥30)</td>
</tr>
<tr>
<td>Esophagus (≥30)</td>
<td>2.64*</td>
<td>Colon &amp; Rectum (≥35)</td>
</tr>
<tr>
<td>Breast (≥40)</td>
<td>2.12</td>
<td>Gall Bladder</td>
</tr>
<tr>
<td>(postmenopausal)</td>
<td></td>
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<tr>
<td>All Cancers (≥40)</td>
<td>1.88</td>
<td>All Cancers (≥40)</td>
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</tbody>
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*Never Smokers

Source: Calle and Thun, Oncogene 2004
Goals of TREC

- **Enhance understanding of the mechanisms underlying the association between energy balance and carcinogenesis across the life cycle**

- **Develop effective approaches with broad population impact at the social-environmental and policy level for the prevention and control of obesity**

- **Bring together diverse disciplines by facilitating new collaborative research endeavors**

- **Create new opportunities for transdisciplinary training**
Growth of TREC Network, 2008

NCI
TREC CC
Fred Hutchinson
University of Minnesota
University of Southern California
Case Western Reserve University

Nutrition Assessment
Physical Activity, Sleep, Env’t Measures
Biomarkers, Specimens, & Methods
Psychosocial and other Behavior
Behavior & Environment Task Force
Molecular Pathways
Evaluation

Accelerometry Interest Group
Physical Activity & Nutrition Intervention WG
Cancer Survival & Survivorship Task Force
Statistics Interest Group
Training Task Force
Markers & Mediators Task Force

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

National Cancer Institute
Mid Course Accomplishments

- Career Development (73 New Investigators)
- Developmental Projects (n=96)
- New NIH Grants (n=11)
- Publications & Presentations
- Special Workshops & Symposia
- Evaluation
Acknowledgements

TREC Investigators & Collaborators
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NCI Energy Balance Work Group
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