

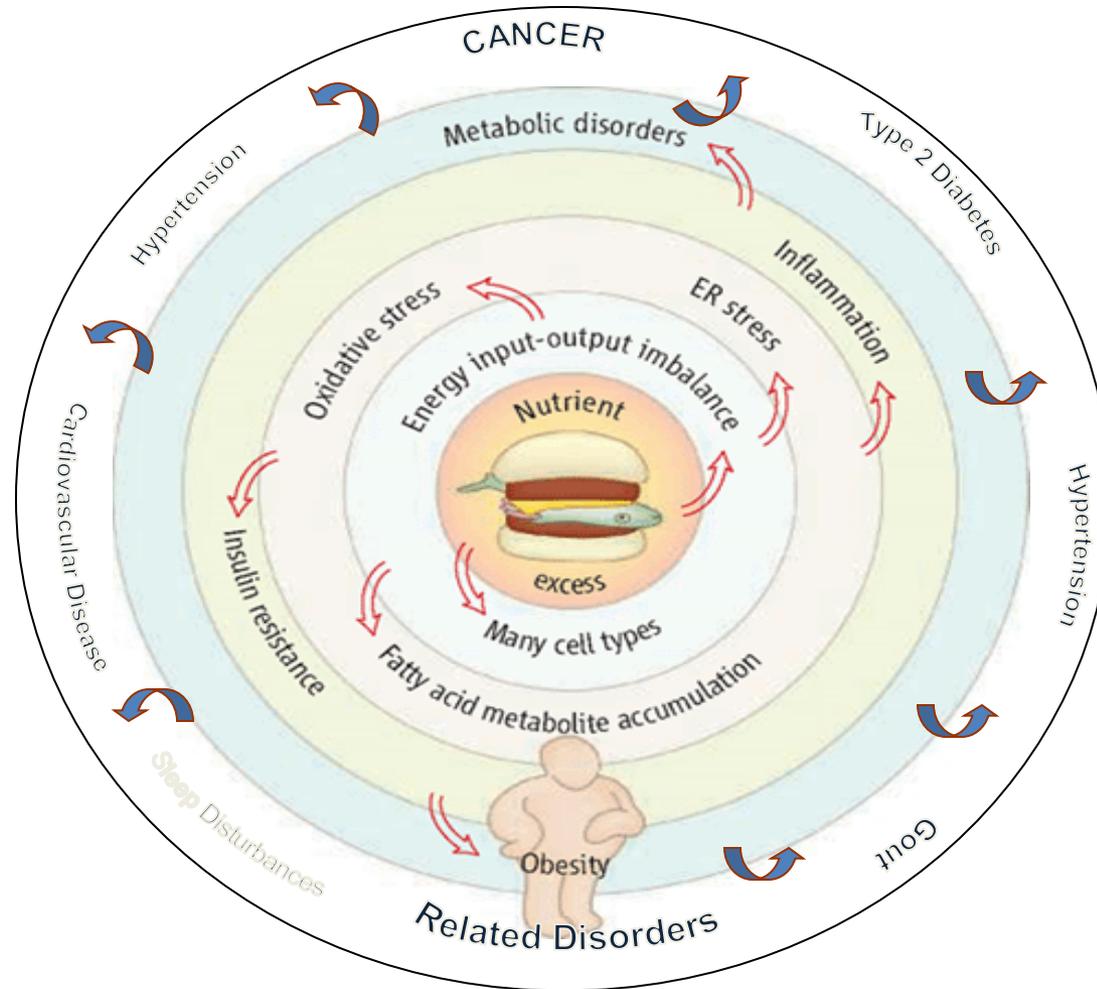
The Role of Obesity in Cancer Survival and Recurrence
A Workshop Hosted by the IOM National Cancer
Policy Forum

October 31 - November 1, 2011
Washington, DC

Signaling Pathway Crosstalk/Systems Biology
Approach

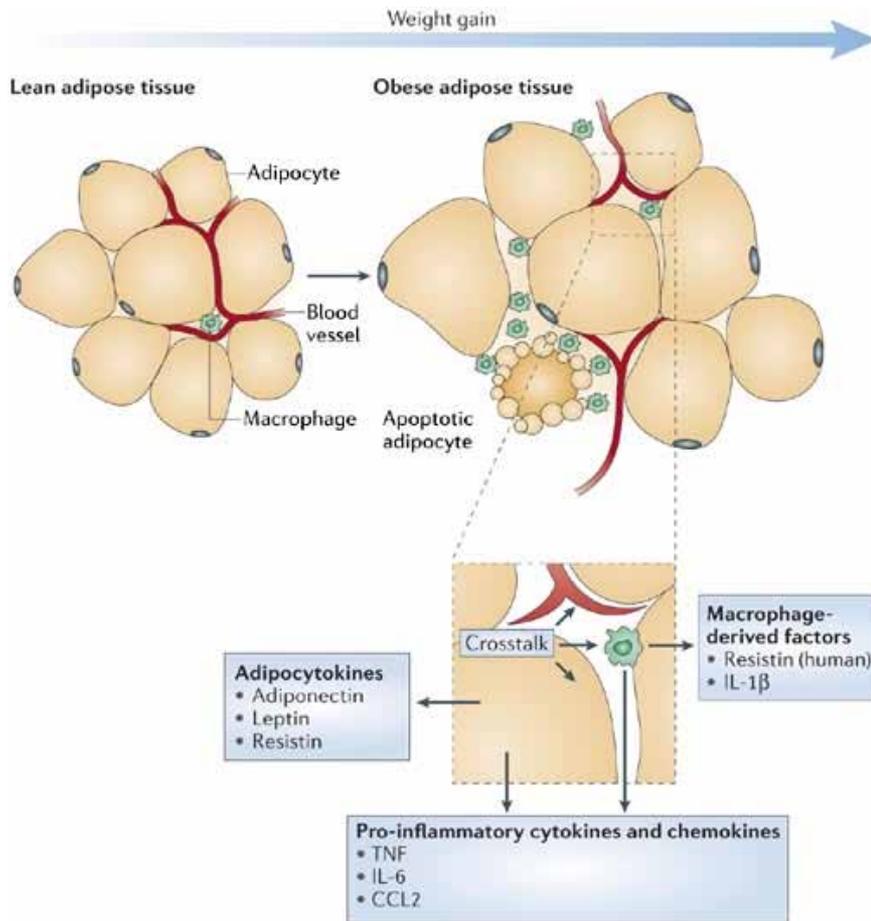
Nathan A. Berger, M.D.
CWRU Distinguished University Professor
Hanna Payne Professor of Experimental Medicine
Professor, Medicine, Biochemistry, Genetics and Oncology
Director, Center for Science, Health & Society
Case Western Reserve University

An Integrative View of Obesity



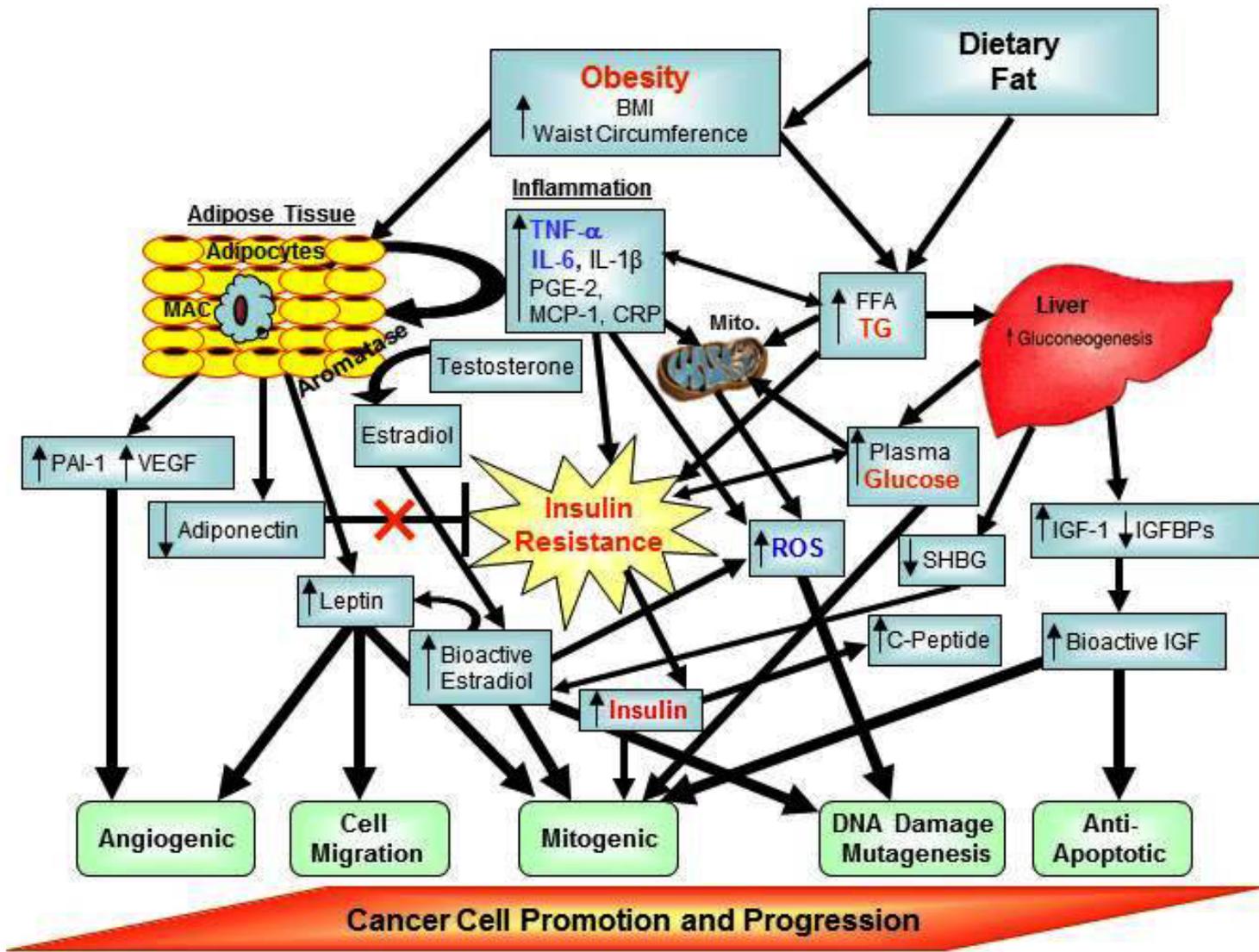
Common Responses to Nutrient Excess

Inflammation, obesity and cancer



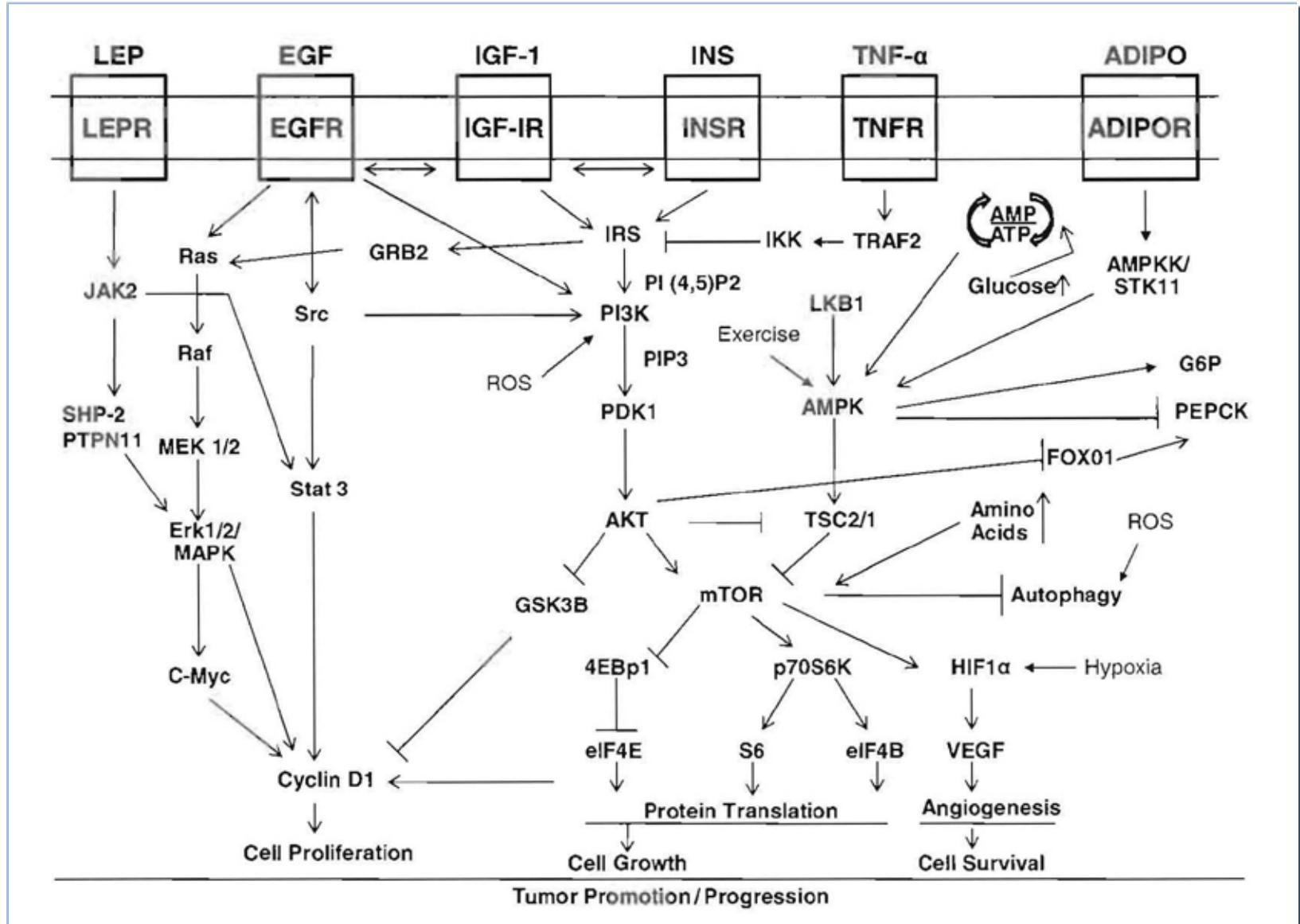
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Nature Reviews | Immunology

- Inflammatory diseases:
 - Patients with IBD, ulcerative colitis and Crohn's disease³
 - Anti-inflammatory drugs reduce tumor formation⁴
 - Aspirin
 - Celebrex
 - Pro-inflammatory factors are elevated⁵



Adapted from Nock NL, Berger NA. Obesity and Cancer: Overview of Mechanism, in Cancer and Energy Balance, Epidemiology and Overview, editor - NA Berger, Springer, 2010.

Putative Molecular Pathways in Obesity Related Cancers



Nock NL, Berger NA. Obesity and Cancer: Overview of Mechanisms in Cancer and Energy Balance, Epidemiology and Overview, edit - NA Berger, Springer 2010.

OBESITY-CANCER SYSTEMS CONSIDERATIONS OF MECHANISMS AND MEDIATORS

- **Initiation**
 - **Promotion**
 - **Progression**
 - **Therapeutics**
 - **Comorbidities**
- **Inflammation, ROS, Mutation**
 - **Enabling Conditions - Microenvironment Mutations**
 - **Hormones, Cytokines, Adipokines**
 - **Interactions, Metabolic Syndrome**
 - **Receptor Crosstalk**
 - **Pathway Crosstalk**
 - **Cellular Crosstalk**
 - **Pharmacokinetics and Pharmacodynamics**
 - **Diabetes, Cardiovascular and Thromboembolic Diseases**

OBESITY-CANCER SYSTEMS CONSIDERATIONS FOR PREVENTION AND THERAPEUTICS

- **Obesity Prevention and Control**
 - **Tobacco Control of the 21st Century**
 - **Socio-Pharmaco - Behavioral-Neuro Endocrine**
- **Physical Activity and Exercise**
 - **Lifelong Programs, Motivation, Sustainability**
- **Obesity Control - Post Diagnosis**
 - **Pharmacologic, Caloric Restriction, Exercise, Bariatric Surgery**
- **Anti Tumor Therapy Based on Obesity as the Driver**
 - **Antiinflammatory Agents**
 - **Block Hormone, Cytokine, Adipokine Production**
 - **Receptor Blockade (Single vs. Multiple)**
 - **Inhibit Energy Stimulated - Mitogenic Pathways**
 - **PI3K-AkT-mTOR**