Curriculum Objectives

To understand how the concept of human biological & cultural evolution is important to understand both the “causes” of diseases and their prevention.

To understand the roles of human stem cell and various forms of cell-cell communication in normal development and how disruption of both of these biological entities, especially during development, by culturally-shaped nutrition and diets can lead to a wide spectrum of diseases.

By understanding these two objectives, better strategies for prevention of the global epidemic of “metabolic diseases” can be generated.

Rationale

- It took millions of years for human ancestors to genetically adapt to their environment for food-derived energy.
- With the acquisition of abstract thinking, language, tool-making, fire, agriculture, domestication of animals, culture emerged to alter the hunter-gatherer diet (feast-famine; low calories; food only within walking distance, seasonal foods, eating only during the daytime).
- Within the last 150 years, culture has re-shaped diets to the point that today we eat (a) process foods, (b) calorically-rich foods; (c) globally-derived foods; and (d) the gut biota has changed. Our life style behaviors have been altered so that there is a global “metabolic disease” crisis associated with obesity.
- New concepts as to how nutrition and diets can affect the mechanisms of both acute infectious and chronic non-infectious diseases have emerged. Altering the number of stem cells during development can influence the risk of all stem-cell based diseases, such as diabetes, cancer, atherosclerosis, and brain function.

Description of Course

This course will be based on a lecture/seminar design. Source material will be from current literature on examples of the Barker hypothesis; and diet studies on diseases, such as colon cancer (Atomic bomb survivors studies).

Lectures on the basic biology and roles of human stem cells on development and how nutrition/diets can influence stem cell biology via alteration of cell-cell communication.

Small group assignment of (a) diets role on various diseases; (b) diets role on stem cells and cell-communication and development; and (c) individual physician—patient or public health prevention/treatment strategies based on the new concepts of this course.

BARKER HYPOTHESIS: Adult Diseases are Linked To Prenatal and Early Post-Natal Life.

Colon Cancer and Diet

Caloric Restriction and Health

Dr. James Trosko, Ph.D., trained as a geneticist, has experience in basic research on the interaction of genetic and environmental factors (radiation, chemicals, viruses, nutrition/diet) on stem cell behavior and cell-cell communication. He has studied the role of Japanese diet on the atomic bomb survivors in Hiroshima/Nagasaki; on the Mediterranean diet on the people of Sicily; and on modern day diets of the South Koreans. His lab was the first to have isolated human adult stem cells and their roles in various diseases. He was the first to develop a cell-cell communication assay to detect food factors that could either contribute to, or prevent, human diseases.

Depending on specific topic during the course, invited specialists will be brought in to discuss the topic

FACULTY

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references

Trosko, J.E. “Pre-natal Epigenetic influences on acute and chronic diseases later in life, such as cancer: Global health crisis resulting from a collision of biological and cultural evolution.” J. Food Science & Nutrition, in press.


NC : Negative control
E2 : 10nM estrogen
TCDD : 100nM
BPA : 10uM
M1 : Metformin 1mM
M10 : Metformin 10mM