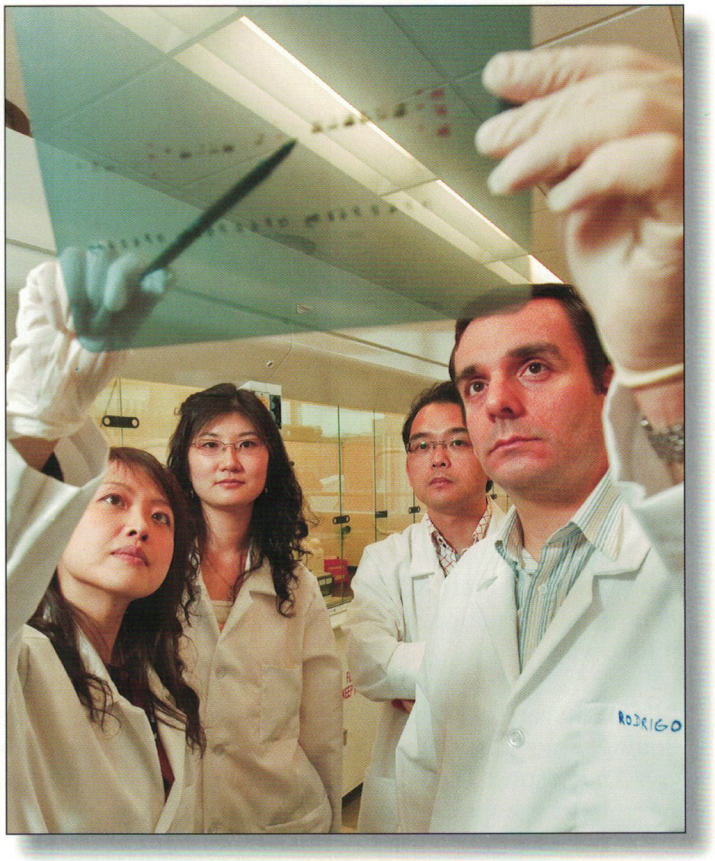
Understanding Estrogen in Metabolism

RODRIGO BARROS

At CNRCS, Dr. Rodrigo Barros has his sights set on providing long term treatment options for diabetes, obesity and cardiovascular diseases. His recent research has focused on providing a better understanding of estradiol, the most potent naturally occurring estrogen in these processes.



"Female hormones have always been associated with the menstrual cycle, pregnancy, breast-feeding and some diseases, such as osteoporosis and breast cancer, typically associated with women," says Barros. "Our group has discovered that estradiol has much wider actions and can no longer be considered exclusively a 'female sex hormone,' but is instead a 'unisex hormone' with multiple actions across several organ systems."

Barros is dedicated to understanding how estradiol regulates feeding and food metabolism, and how it relates to metabolic diseases, including eating disorders, obesity and diabetes. Research has indicated that when there is an excessive or insufficient amount of estradiol present, the metabolic network becomes imbalanced, which can result in such metabolic diseases.

"We believe that all the systems in the body involved with food consumption and metabolism, which include the brain, liver, pancreas, heart, muscles and fat, are connected by estradiol, resulting in a 'metabolic network' regulated by the hormone," Barros says. "Our evidence shows that when too much or too little estradiol is available, this delicate network loses its balance and metabolic diseases set in."

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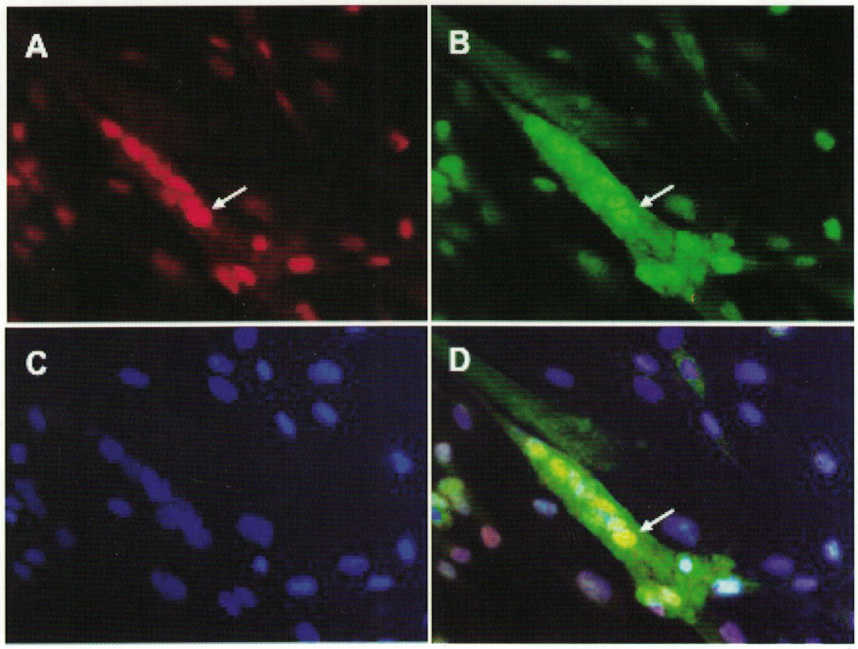
This research has important implications for the average consumer, as well as for physicians. While hormones like estradiol are important for the adequate maintenance of body functioning, they may pose serious risks to a person's health if misused as supplements. This comes into play when people use alternative forms of hormones, such as natural plant derivatives, that may be harmful if used inappropriately.

For specialists dealing with hormonal treatments, this research underscores that they should be aware that several organs and body functions are affected when estradiol is prescribed and may cause or worsen metabolic diseases. Due to the number of organs and functions affected by fluctuating levels of estradiol, its use as a hormonal treatment for patients with delayed puberty, menopausal symptoms, osteoporosis and prostate cancer is a source of debate within the medical and research communities. Exploring the impact of such treatments as reported recently in *Cell Metabolism* by Barros and Gustafsson is helpful for keeping these professionals abreast of new research and guidelines.

In 1995, Barros earned an M.D. and later a Ph.D. from the University of Sao Paulo in Brazil. Shortly thereafter he accepted a postdoctoral fellowship at the Karolinska Institutet in Stockholm, Sweden. He joined the Center in 2009.



Expression and colocalization of ERα and ERβ in L6-myotubes by immunofluorescence. For colocalization (D), the yellow/orange color in the merged image reveals that ERα and ERβ coexpress in the same nucleus (Molecular and Cellular Endocrinology 2008).

Recent Publications:

Barros, RP, Gustafsson J-Å. Estrogen Receptors and the Metabolic Network. Cell Metab. 2011 Sep 7;14(3): 289-99.

Korach-André M, Archer A, Gabbi C, **Barros RP**, Pedrelli M, Steffensen KR, Pettersson AT, Laurencikiene J, Parini P, Gustafsson J-Å. Liver X receptors regulate de novo lipogenesis in a tissue-specific manner in C57BL/6 female mice. Am J Physiol Endocrinol Metab. 2011 Jul; 301(1): E210-22. Epub 2011 Apr 26.