



Gustavo Monteiro Silva

Assistant Professor of Biology
Trinity College of Arts and Science

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Professional Links

[Silva lab at Duke University](#)

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Overview

My main research goal is to understand and be able to control how cells respond to stressful and harmful conditions, which are the underlying causes of many human diseases. To achieve this goal, I study cellular response to stress at the protein level and aim to characterize the different regulatory functions mediated by the ubiquitin-proteasome system (UPS), essential machinery involved in modulating protein dynamics. Ultimately, regulating specific UPS roles will provide new tools to increase cellular tolerance to a variety of environmental stresses, which is highly relevant for a variety of degenerative diseases. The main focus of my lab is to investigate the unprecedented regulation of translation mediated by ubiquitin. I laid the groundwork for this research investigating the ubiquitination response in the budding yeast *Saccharomyces cerevisiae* and we will explore the evolutionary conservation of this pathway and its function in neuronal cells. Our lab is excited to keep pushing the field forward and to use a combination of proteomics, genomics, and molecular methods to understand the mechanisms by which ubiquitin regulates translation, and ultimately, cellular response to stress.

Current Appointments & Affiliations

Historical Appointments

Assistant Professor of Biology, [Biology](#), [Trinity College of Arts & Sciences](#)



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Publications

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A synopsis on aging—Theories, mechanisms and future prospects

JP da Costa, GM Silva, [+7 authors](#) • Aging Research Reviews • August 2016

Answering the question as to why we age is tantamount to answering the question of what is life itself. There are countless theories as to why and how we age, but, until recently, the very definition of aging – senescence – was still uncertain... [\(More\)](#)

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Recurrent mutations of chromatin-remodeling genes and kinase receptors in pheochromocytomas and paragangliomas

RA Toledo, GM Silva, [+9 authors](#) • Clinical Cancer Research • May 2016

Pheochromocytomas and paragangliomas (PPGL) are catecholamine-secreting tumors of neural crest origin that arise from the sympathetic lineage cells of the adrenal medulla and paraganglia, respectively. More than 40% of these tumors... [\(More\)](#)

Subject Headings

RNA Polymerase II
Gene Expression Profiling
Cell Lineage
Ubiquitination
Stress, Physiological
Genomics
Germ Cells

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Quantifying gene expression: the importance of being subtle

GM Silva, C Vogel • Molecular Systems Biology • October 2016

Gene expression is regulated at both the mRNA and protein level through on-off switches and fine-tuned control. In their recent study, Edfors et al (2016) use highly accurate, targeted proteomics methods and examine to what extent the amount of protein produced per mRNA transcript varies across different tissues. They find that the bulk part of protein concentrations is set at a per-gene level: This relationship, the protein/mRNA ratio, is constant across cell types and tissues, but varies by several orders of magnitude across genes. In recent years, a flurry of studies has examined the relationship between mRNA and protein concentrations across genes, with sometimes contradicting findings (Liu et al, 2016). In yeast protein concentration can be predicted very well from mRNA concentration (Csardi et al, 2015). On the other hand, in mammalian cells the correlation has been shown to be much lower and variable depending on the cell type and state. The situation becomes even more complicated for cells that have been subjected to a stimulus. For example, during the response of dendritic cells to lipopolysaccharide treatment, each protein's concentration appears to be largely determined by its mRNA concentration, as expected from a condition known to involve extensive transcriptional regulation (Jovanoic et al, 2015). ([Show less](#))

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Funding

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Defining the roles of ubiquitination during the environmental stress response

Contributors: Andrew Gorman, Gustavo M Silva, Vanessa Simoes

Funding Agency: National Institutes of Health

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Organization and Function of Cellular Structure

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