

**BIOGRAPHICAL SKETCH**

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NAME: Ana Cristina Roginski, PhD.

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POSITION TITLE: Postdoctoral Fellow

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (If applicable)	Completion Date MM/YYYY	FIELD OF STUDY
URI – Campus Erechim, Erechim, BR	BS	01/2018	Pharmacy
Federal University of Rio Grande do Sul, Porto Alegre, BR	PhD	03/2022	Biochemistry
Arizona State University, Tempe, USA	Postdoctoral Fellow	-	Immunology

**A. Personal Statement**

My academic training and research experience have provided me with an excellent background in multiple biological disciplines, including biochemistry, mitochondrial metabolism, and toxicology. As an undergraduate student fellow, I researched with Dr. Fernanda Dal'Maso Camera on the effects of passive smoking of hand-made cigarettes on mice's peripheral organs. During this period, I contributed to establishing a chronic exposition of the passive smoking mice model. Moreover, I standardize different parameters of oxidative stress evaluation and the *Ilex paraguariensis* St. Hil. (Yerba Mate) hydrophilic extract preparation at the URI-Campus Erechim. As a predoctoral student fellow in Dr. Moacir Wajner's laboratory and under Dr. Alexandre Umpierrez Amaral's supervision, I studied the biochemical mechanisms related to the pathogenesis of Propionic Acidemia (PA), analyzing the cardiac and renal mitochondrial metabolism and physiology. As a result, I could describe a crucial mitochondrial respiration disruption related to NADH-linked substrates, especially glutamate and  $\alpha$ -ketoglutarate oxidation, culminating in a severe ATP production impairment and compromised mitochondrial physiology. These findings are associated with the competitive inhibition of glutamate and  $\alpha$ -ketoglutarate dehydrogenases without compromising the electron transport chain complex's activity, described for the first time in *Roginski, AC. et al. (2019), (2020), and (2022).*

My undergraduate and graduate trajectory were only possible, thankfully, for the full scholarships that I was awarded for both, which made me the first generation of my family to achieve higher education and a Ph.D. degree. For my postdoctoral training, I will switch my research field to immunology. My goal is to define the cellular defenses that protect organisms from environmental toxins through the biochemical, cellular, and molecular biology perspectives and characterize how these defenses are built during development. The multi-disciplinary that constitutes my background provides me a reliable point of departure to perform a research program for elucidating the mechanisms related to these defenses. My sponsor Dr. Esther Florsheim is a leader with extensive immunology experience, a culturally diverse background, and international experience simultaneously, which allows her to recognize unmet needs during the postdoctoral training that benefits me. In addition, the proposed training plan outlines a set of career development activities and workshops – e.g., grant writing, public speaking, lab management, and mentoring students – designed to enhance my ability to become an independent investigator. I am confident that my training choices will give me a solid foundation to reach my goal of studying immunological defenses against environmental toxins and my long-term research goals involving becoming an independent researcher and mentor.

## B. Positions, Scientific Appointments, and Honors

### Positions:

- 2012 – 2017 Undergraduate fellow (CNPq), URI-Campus Erechim, Erechim, BR  
2015 – 2017 Teaching Assistant, URI-Campus Erechim, Erechim, BR  
2018 – 2022 Graduate Fellow, Federal University of Rio Grande do Sul, Porto Alegre, BR  
2022 – 2022 Visiting Scholar, Arizona State University, Tempe, EUA  
2022 – Postdoctoral Fellow, Arizona State University, Tempe, EUA

### Honors and Awards:

- 2013 – 2017 Undergraduate scholarship, Programa Universidade Para Todos, (PROUNI), BR.  
2018 – 2022 Ph.D. scholarship, Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), BR.  
2019 Honorable mention, VI Mostra da Bioquímica, Federal University of Rio Grande do Sul, BR  
2023 AAI Minority Scientist Travel Award, American Association of Immunologists, USA.

## C. Contributions to Science

**1. Early career:** My early career contributions were focused on the oxidative stress effects of passive smoking on mice in the peripheral tissues such as the lung, liver, and skeletal muscles. More specifically, I worked with establishing and performing the chronic model of exposition of the mice to the passive smoking of hand-made cigarettes and developing the *Ilex paraguariensis* *St. Hil.* (Yerba Mate) hydrophilic extract.

### Book chapters:

- a. Faggion, M.; **Roginski, AC.**; Roman, SS.; Wisniewski, MSW.; Wisniewski, E.; Pinho, RA.; Nesi, RT.; Camera, FDM. Efeitos do exercício aeróbico no músculo sóleo de animais expostos à fumaça do cigarro de palha artesanal e cigarro industrial. In: Janesca Mansur Guedes. (Org.). *Fisioterapia no caminho da arte*. 1ed. Erechim, RS: EdiFAPES, 2017, v. 2, p. 89-99.
- b. Wilhelm, J.; **Roginski, AC.**; Roman, SS.; Wisniewski, MSW.; Wisniewski, E.; Pinho, RA.; Nesi, RT.; Camera, FDM. Efeitos do exercício físico no músculo gastrocnêmio de camundongos Swiss expostos cronicamente à fumaça do cigarro de palha e cigarro industrial. In: Janesca Mansur Guedes. (Org.). *Fisioterapia no caminho da arte*. 1ed. Erechim, RS: EdiFAPES, 2017, v. 2, p. 75-87.

### More significant poster sessions:

- a. Camera, FDM.; Wisniewski, MSW. ; Sbardelotto, ML. ; Wisniewski, E. ; Roman, SS. ; Guedes, JM.; Amaral, AU.; Brusco, PP.; Mosele, VMZ.; **Roginski, AC.** Efeitos do Treinamento de Força no Músculo Gastrocnêmio e Tecido Cerebral de Animais Submetidos à Fumaça Crônica de Cigarro de Palha Comercial. In: 5º Congresso Internacional em Saúde, 2018, Braga, Portugal. 5º Congresso Internacional em Saúde - Atividade física e Saúde. Braga, Portugal: Instituto de Educação, Universidade do Minho, 2018. p. 91-91.

During my undergraduate student period, I contributed with other researchers been responsible by the oxidative stress parameters evaluation in their projects. These collaborations result in the following publications:

### Published papers in collaboration:

- a. Ribas, ME, Muniz, FWMG, Steffens, T, Gomes, A, Volpato, N, Volpato, N, Kociczkeski, G, Pitoni, L, Bertol, EC, **Roginski, AC**, Amaral, AU, Diefenthaeler, H, & Rösing, CK. The Effect of

Periodontal Diseases and Cognitive Deficit on Behavioral State, Oxidative Stress Parameters and Alveolar Bone Loss in Rats. *Journal of the International Academy of Periodontology*. 2020 Oct 1. PMID: [32980828](#).

### More significant poster sessions:

- a. Amaral, AU; Cecatto, C; Godoy, KS; **Roginski, AC**; Spannwnberger, KP; Wajner, A; Schimit, MOV; Silva, LHR; Castilho, RF; Wajner, M. Disturbance of mitochondrial respiration by the major fatty acids accumulating in VLCAD deficiency in heart liver and brain of rats. In: 46a. Annual Meeting of the Brazilian Society of Biochemistry and Molecular Biology - SBBq, 2017, Águas de Lindóia. Brazil, 2017.
- b. **Roginski, AC**; Cecatto, C; Godoy, KS; Spannwnberger, KP; Wajner, M; Amaral, AU. Experimental Evidence That the Metabolites Accumulating in Propionic Acidemia Impair NADH-Linked Oxidative Metabolism. In: XIII International Congress of Inborn Errors of Metabolism, 2017, Rio de Janeiro, Brazil.
- c. **Roginski, AC**; Cecatto, C; Spannberger, KP; Castilho, RF; Wajner, M; Amaral, AU. Maleic and propionic acids impair mitochondrial bioenergetics in kidney of developing rats. In: 47a Reunião Anual da Sociedade Brasileira de Bioquímica e Biologia Molecular, 2018, Joinville, Brazil.

**2. Graduate Career:** My contributions to science during my graduate research focused on mitochondrial metabolism and biochemical impairment using in vitro model to study Propionic acidemia, an inborn error of metabolism characterized by genetic mutations that compromised an essential step of branched-chain amino acids catabolism. The results from my research were highly relevant as they provided original details into a significant metabolism impairment in glutamate and  $\alpha$ -ketoglutarate oxidation provoked by maleic acid and propionic acid, two metabolites accumulated in Propionic acidemia. These metabolites induce a competitive inhibition of glutamate and  $\alpha$ -ketoglutarate dehydrogenases culminating in a severe ATP production impairment and compromised mitochondrial physiology in the cardiac and renal tissues.

- a. **Roginski, AC**; Cecatto, C; Wajner, SM; Camera, FDM; Castilho, RF; Wajner, M; Amaral, AU. *Experimental evidence that maleic acid markedly compromises glutamate oxidation through inhibition of glutamate dehydrogenase and  $\alpha$ -ketoglutarate dehydrogenase activities in kidney of developing rats.* *Molecular and Cellular Biochemistry*. 2019 Apr 29. PMID: [31032535](#). doi: 10.1007/s11010-019-03534-7.
- b. **Roginski, AC**; Wajner, A; Cecatto, C; Wajner, SM; Castilho, RF; Wajner, M; Amaral, AU. *Disturbance of bioenergetics and calcium homeostasis provoked by metabolites accumulating in propionic acidemia in heart mitochondria of developing rats.* *BBA-Molecular Basis of Disease*. 2020 May 1. PMID: [31931102](#) doi: 10.1016/j.bbadis.2020.165682.
- c. **Roginski, AC**; Zemni ak, AB; Marschner, RA; Wajner, SM; Ribeiro, RT; Wajner, M; Amaral, AU. *Disruption of mitochondrial functions involving mitochondrial permeability transition pore opening caused by maleic acid in rat kidney.* *Journal of Bioenergetics and Biomembranes*. 2022 July 23. PMID: [35902433](#) doi: doi.org/10.1007/s10863-022-09945-4

Moreover, I contributed to several collaborative studies on other inborn errors of metabolism models, neonatal hypoxia-ischemia, and LPS infection. My particular role in the projects was performing the investigation of mitochondrial metabolism and physiology. I conducted assays such as high-resolution mitochondrial respirometry, enzymatic kinetic evaluation, mitochondrial membrane potential, calcium retention capacity, and respiratory complexes activity.

- a. Cecatto, C; Amaral, AU; **Roginski, AC**; Castilho, RF; Wajner, M. *Impairment of mitochondrial bioenergetics and permeability transition induction caused by major long-chain fatty acids accumulating in VLCAD deficiency in skeletal muscle as potential pathomechanisms of myopathy.* *Toxicology in Vitro*. 2020 Feb. PMID: [31629068](#) doi: 10.1016/j.tiv.2019.104665.
- b. Odorcyk, FK; Ribeiro, RT; **Roginski, AC**; Duran-Carabali, LE; Couto-Pereira, N; Wajner, M; Dalmaz, C; Netto, CA. *Differential age-dependent mitochondrial dysfunction, oxidative stress and*

- apoptosis induced by neonatal hypoxia-ischemia in the immature rat brain*. Molecular Neurobiology. 2021 Jan 8. PMID: [33417220](#) doi: [10.1007/s12035-020-02261-1](#).
- c. Alvorcem, LM; Britto, R; Cecatto, C; **Roginski, AC**; Rohden, F; Scholla, JN; Gumaa, FCR; Figueiro, F; Amaral, AU; Zanatta, G; Seminotti, B; Wajner, M; Leipnitz, G. *Ethylmalonic acid impairs bioenergetics by disturbing succinate and glutamate oxidation and induces mitochondrial permeability transition pore opening in rat cerebellum*. Journal of Neurochemistry. 2021 Apr 10. PMID: [33837559](#) doi: [10.1111/jnc.15363](#).
- d. Seminotti, B; **Roginski, AC**; Zanatta, Â; Amaral, AU; Fernandes, T; Spannenberger, KP; Da Silva, LHR; Ribeiro, RT; Leipnitz, G; Wajner, M. *S-adenosylmethionine induces mitochondrial dysfunction, permeability transition pore opening and redox imbalance in subcellular preparations of rat liver*. M. Journal of Bioenergetics and Biomembranes. 2021 Aug 04. PMID: [34347214](#) doi: [10.1007/s10863-021-09914-3](#).
- e. Vizuete, AFK.; Fróes, F; Seady, M; Zanotto, C; Bobermin, LD; **Roginski, AC**; Wajner, M; Quincozes-Santos, A; Gonçalves, CA. *Early effects of LPS-induced neuroinflammation on the rat hippocampal glycolytic pathway*. Journal of Neuroinflammation. 2022 Oct 11. PMID: [36221097](#) doi: [10.1186/s12974-022-02612-w](#)
- f. Ribeiro, RT; **Roginski, AC**; Marschner, RA; Wajner, SM; Castilho, RF; Amaral, AU; Wajner, M. *Disruption of mitochondrial bioenergetics, calcium retention capacity and cell viability caused by D-2-hydroxyglutaric acid in the heart*. *Biochimie*. 2022 Nov 11. PMID: [36372308](#) doi: [10.1016/j.biochi.2022.11.004](#)
- g. Zemni  ak  B, **Roginski AC**, Ribeiro RT, Bender, JG, Marschner, RA, Wajner, SM, Wajner, M, Amaral, AU. *Disruption of mitochondrial bioenergetics and calcium homeostasis by phytanic acid in the heart: Potential relevance for the cardiomyopathy in Refsum disease*. *Biochimica et Biophysica Acta - Bioenergetics*. 2023 Apr (Epub). PMID: [36812958](#) doi:[10.1016/j.bbabo.2023.14896](#).

**Complete List of Published Work in My Bibliography:**

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