# CURRICULUM VITAE

## Biographical Information


**Name:** Fábio Vasconcelos Fonseca, PhD
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## Education:

**PhD-Biochemistry (April 2003)**

**Thesis Title:** "Characterization of an Ectonucleotide Diphosphohidrolase Present in the Surface Membrane of Tripanosomatídeo *Trypanosoma rangeli*. A Probable Role in the Acquirement of Adenosine. Regulation by Carbohydrates and Lipophorin, both Present in Hemocele of Rhodnius prolixus".
**Institution:** Department of Medical Biochemistry of the Biomedical Institute of Sciences of Universidade Federal do Rio de Janeiro.
**Supervisor:** Professor José Roberto Meyer Fernandes (meyer@bioqmed.ufrj.br), Laboratory of Biochemistry, Bioenergetics and Cellular Biology.

**MA-Biosciences and Biotechnology (August of 2000)**

**Thesis Title:** "An α–Glucosidase of Perimicrovillar Membrane in *Quesada gigas* (Hemiptera: Cicadidae): Purification, Characterization and Immunocitolocalization".
**Institution:** Center of Biosciences and Biotechnology of Universidade Estadual do Norte Fluminense.
**Supervisor:** Professor Carlos Peres Silva (capsilva@uenf.br), Laboratory of Protein Chemistry, Function and Structure.

**BSc-Biosciences and Biotechnology (August 1998)**

**Thesis Title:** "*Paracoccidioides brasiliensis* Exoantigens: A Role in the Activation of T Lymphocytes, B Lymphocytes and Murine Macrophages"
**Institution:** Center of Biosciences and Biotechnology of Universidade Estadual do Norte Fluminense.
**Supervisor:** Professor Andrea Cristina Veto Arnholdt (arnholdt@uenf.br), Laboratory of Immunology.

## Publications

**Fonseca FV**, de Souza ALF, Mariano AC, Entringer PF, Gondim KC & Meyer-Fernandes JR (2006) *Trypanossoma rangeli*: Characterization of a Mg-dependent ecto-ATP-diphosphohydrolase activity. *Experimental Parasitology* **112:**76-84.

Silva CP, Silva JR, **Fonseca FV**, Petretski MDA, DaMatta RA, Ribeiro AF & Terra WR (2004) Occurrence of midgut perimicrovillar membranes in paraneopteran insect orders with comments on their function and evolutionary significance *Arthropod Structure & Development*. **33:**139-148.

Fernandes EC, Granjeiro JM, Aoyama H, **Fonseca FV**, Meyer-Fernandes JR & Vercesi AE (2003) A Metallo Phosphatase Activity Present on The Surface of *Trypanosoma brucei brucei* Procyclic Forms. *Veterinary Parasitology*. **118:** 19-28.

**Vasconcelos FF**, Silva JR, Petretski MDA, DaMatta RA, Terra WR, & Silva CP (2006) Purification and partial characterisation of an intestinal membrane-bound α-glucosidase from *Quesada gigas* (Hemiptera: Cicadidae). *Insect Biochemistry & Molecular Biology* (submitted).

Vericimo MA, **Fonseca FV**, Retamal C, Silva CP, Kipnis TL & Arnholdt ACV (2006) Short time polyclonal activation induced by *Paracoccidiodes brasiliensis* exoantigens. *Microbes and Infection* (submitted).

## Conference Presentations

Mariano A.C., Ortis Costa S., Carvalho R.N., **Vasconcelos FF**, Brinn L., Sorenson M. and Cameron L.C.; 1995. Identification of brain myosin V (BmV) in four mammalian species: Ox, Pig, Goat and Dog. *XXIV Reunião Annual da SBBq.* **POSTER .**

Silva C.P., Xavier-Filho J., Terra W.R., Juliano L., Lima R.M., Pontes E.G., Silva S.F. and **Vasconcelos FF**, 1997. Fine specificity of digestive proteinases from *Callosobruchus maculatus* and *Zabrotes subfasciatus* (COLWOPTERA-BRUCHIDAE). *XXVI Reunião Annual da SBBq.* **POSTER.**

Verícimo M.A., **Vasconcelos FF**; Camargo Z., Kipnis TL. and Arnholdt ACV. ; 1998,

Exoantigens of *Paracoccidioides brasiliensis* can induce de policlonal activation and others immunoregulatory events. *II Congresso Brasileiro de Micologia.* **POSTER.**

Verícimo M.A., **Vasconcelos F.F.**, Camargo Z., Kipnis TL. And Arnholdt ACV.; 1998. Policlonal activation during experimental infection with *P. brasiliensis* (strain Pb 18). *II Congresso Brasileiro de Micologia.* **POSTER.**

Ribeiro Gomes FL., **Vasconcelos FF**, Mendonça-Previato L., Dos Reis GA. And Arnholdt ACV.; 1998. *Trypanosoma cruzi* glycoinositolphospholipid and its ceramide domain induces apoptosis and regulates the expression of MHC class II in human macrophages. *XXV Reunião Annual de Pesquisa Básica em Doença de Chagas.* **Oral Communication**.

**Vasconcelos FF**, Verícimo MA., Bozhkov V., Kipnis T.L. and Arnholdt ACV; 1999. Exoantigen of *Paracoccidioides brasiliensis* promotes T/B cell interactions by CD-28-B7 pair and down-regulates adhesion and co-stimulation molecules in murine macrophages. VII Encontro Internacional sobre Paracococcidioidomicose. **POSTER.**

Silva CP., Terra WR., Petretski MD., Silva JR. And **Vasconcelos FF**., 2000. Occurrence of a α-Glucosidase as a biochemical marker for perimicrovillar membranes in Hemiptera and Thysanoptera. *XXIX Reunião Anual da SBBq.* **POSTER.**

DaMatta,R.A.; **Fonseca FV**.; Silva, J.R. and Silva, C.P.; 2001. Immunolocalization Of Alpha-Glucosidase At The Midgut of Quesada gigas. **Proceeding of Meeting: Acta Microscópica, Supplement C, 3: 19-20**. *Proceeding of The XVIII Congress Of The Brasilian Society For Microscopy And Microanalisys. Novembro 2001 Águas de Lindóia (SP).* **Short communication papar and poster.**

**Fonseca FV**. & Meyer-Fernandes,J.R.; 2002. Identification And Characterization of $Mg^{+2}$ – Dependent EctoATPase And Ectophosphatase Activities On The Surface Of Trypanossomatidae: *Typanossoma rangeli. XXXI Reunião Anual da SBBq.* ***Observation:*** **This presentation is now being prepared for publication by my PhD supervisor and will be submitted this year.**

Leite, M.S.; **Fonseca FV**.; Vercesi, A.E. and Meyer-Fernandes,J.R.; 2002. Characterization of Mg+2–Dependent Ectonucleotide Diphosphohydrolase In *Trypanossoma brucei brucei*. *XXXI Reunião Anual da SBBq*. ***Observation:*** **This**

**presentation is now being prepared for publication by my PhD supervisor and will be submitted this year.**

## Hospital or Affiliated Institution Appointments

**2005-Present:** Post-Doctoral Research Fellow, Weill Medical College of Cornell University (NY). **Supervisor:** Dr. Luis EN Quadri (leq2001@med.cornell.edu).

## Laboratory Techniques

1-Mammalian Cell Culture for different cell lines (HUVEC, Muscle Cells, Heart Cells, - Cells and Hepatocytes, 293 cells.
2-Parasites Culture.: (*Trypanosoma cruzi, Trypanosoma brucei brucei, Trypanosoma rangeli* and Leishmanias.
3-Fungi Culture.: *Paracoccidioides brasiliensis.*
Insect dissection (Thrips, *Rhodnius prolixus,* pulgao (aphid), *Dysdercus peruvianus* and *Quesada gigas*.
4-Western-Blotting
5-HPLC (analysis of aminoacids, analysis of nucleotides, analysis of phosphocreatine and creatine and for protein purification).
6-FPLC (For protein purification)
7-Flow Cytometer
8-ELISA
9-PCR, RT-PCR
10-Adenovirus manipulation, purification, amplification and titration
11-Protein Expression
12-Gene Cloning strategies
13-Sequencing of proteins and DNA
14-Design of Primers
15-Bioinformatics
16-Determination of Protein concentration (Folin-Lowry, Bradford and BCA)
17-SDS-PAGE
18-Scraping Cells
19-Manipulation of Radioactive Materials

20-Manipulation of mice and rats
21-Protein Purification
22-Policlonal Antibody Production
23-Nitric Oxide Quantitation
24-Purification of Cells
25-Immunostaining
26-Immunofluorescence
27-Immunohistochemystry and histochemistry
28-Immunopreciptation
29-Cell Signaling
30-I am proficient in these 3 different areas: Immunology, Biochemistry and Molecular Cell Biology.
31-Genomic Libraries

## Narrative Report of Research

Most of my time and effort is spent on research. During the last four years my research was focused on 3 main subjects. In the first subject, we developed a new concept to control insect population. In order to achieve this, we purified a major enzyme involved in the digestion of carbohydrates, a membrane bound α-Glucosidase present on the surface of perimicrovillar membranes in the *Quesada gigas* (Hemiptera: Cicadoidea). We produced a polyclonal antibody in rabit, this antibody had the capability to kill aphids (sap suckers) when they were fed artificially. In addition, we demonstrated the presence of this α-Glucosidase in several paraneopteran orders by transmission electron microscopy coupled with immunogold labeling, and we describe the function and the evolutionary significance of this enzyme.

The second subject was focused on the characterization of new NTPDases and EctoPhosphatases present in the membrane of *Trypanosoma rangeli* (amastigote forms) and in *Trypanosoma brucei* (pro-cyclic forms). The catalytic center of these enzymes faces the extracellular medium which allows the living and intact parasites to hydrolyze extracellular nucleotides. We demonstrated that these new NTPDases were involved in the salvage of purines, since these parasites are unable to produce their own adenosine, due to the lack of a de novo purine synthesis pathway. In addition we characterized all the kinetic parameters of these enzymes: (Optimal pH, effect of divalent metals ions, Km, inhibitors patterns, curves of metal dependency). In order to confirm that this enzyme was a true EctoATPase, a dose-dependent response to suramin (an antagonist of P2 purinoreceptors and a classical inhibitor of EctoATPases) and a dose-dependent response to DIDS (an impermeant inhibitor) were established. In addition we showed that NTPDase from Trypanosoma *rangeli* is positively modulated by lipophorin, a hemolinph protein involved in the lipid transport and also in the activation of the innate immune system of the insect vector *Rhodnius prolixus*. In this regard, lipophorin (a host protein) can up-regulate the activity of the NTPDase, suggesting a high degree of specificity in parasite host-interaction. In addition I'm a co-author in two other papers that now are in the final phase of construction: 1) Characterization of Ectophosphatases Activities Present in the Membrane Surface of *Trypanosoma rangeli* ; (2) Characterization of an NTPDase present in the Membrane Surface of the Tripanonomatidae *Trypanosoma brucei brucei* (prociclic forms). These titles are provisory and can be changed by my mentor Jose Roberto Meyer-Fernandes.

In my current research project at Weill Medical College (Cornell University) I’m building genomic libraries of *Yersinia pestis* in *E. coli* and in *Yersinia pestis*, also I’m looking for a new targets for drug development and control of *Yersinia pestis* and *M. tuberculosis*.