
APPLICANT BIOGRAPHICAL SKETCH

NAME OF APPLICANT: Walid Abi Habib

eRA COMMONS USER NAME (credential, e.g., agency login): Abi Habib W

POSITION TITLE: Postdoctoral Researcher

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	START DATE	END DATE	FIELD OF STUDY
Van Andel Institute, Grand Rapids, Michigan – USA		01/2017	01/2020	Cancer Epigenetics
Université Pierre et Marie Curie, Paris – France	PhD	11/2012	06/2016	Genomic Imprinting
Université René Descartes, Paris – France		01/2012	08/2012	Neurosciences
Université Saint Joseph, Beirut – Lebanon	M.S	09/2010	08/2012	Functional Genomics
Université Saint Joseph, Beirut – Lebanon	B.S	09/2007	07/2010	Biology and Biochemistry

A. Personal Statement

I earned a B.S. in biology and biochemistry and a M.S. in the structures and interactions of macromolecules and functional genomics from Université Saint Joseph in Beirut, Lebanon. While there, I helped characterize a new strain of *Bacillus thuringiensis*, a bacterium often used as a biological pesticide, and contributed significantly to the field's understanding of the transcriptome and proteome of the amniotic membrane in ocular pathologies. I then went on to pursue my M.S training in Université René Descartes in Paris where I worked on oligodendrocytes maturation and differentiation during central nervous system remyelination in a mice model of multiple sclerosis. I continued my scientific formation by earning a Ph.D. from Université Pierre et Marie Curie in Paris, where I identified new genetic and epigenetic mechanisms related to human growth pathologies in Beckwith-Wiedemann syndrome and Silver-Russell syndrome. In January 2017, I joined the laboratory of Dr. Peter W. Laird at Van Andel Research Institute in Grand Rapids, Mich., where I will be studying single-cell and cell-free DNA methylation patterns in cancer.

B. Positions and Honors

ACTIVITY/ OCCUPATION	START DATE	END DATE	FIELD	INSTITUTION/ COMPANY	SUPERVISOR/ EMPLOYER
Postdoc	01/2017	01/2020	Cancer Epigenetics	Van Andel Institute	Pr Peter W Laird
University Lecturer	01/2015	01/2017	Molecular Biology and Epigenetics	Pierre et Marie Curie faculty of medicine	Université Pierre et Marie Curie
Researcher	11/2012	12/2016	Genomic Imprinting	INSERM U938	Pr Irène Netchine
Research Internship	01/2012	08/2012	Neurosciences	Université René Descartes	Pr Charbel Massaad
Research Internship	01/2011	12/2011	Molecular Biology	Lebanese Tissue Bank	Pr Mireille Kallassy Awad
Research Internship	01/2009	01/2011	Microbiology	Université Saint Joseph	Pr Mireille Kallassy Awad

Awards/External Funding:

French Society of Pediatric Endocrinology and Diabetes scholarship
Fondation Maladies Rares grant
European FP7 Marie Curie Actions scholarship

C. Contributions to Science

My Contributions to Science are organized into two time periods: I. Early Career and II. Graduate Career.

I. Early Career: During my undergraduate studies, I became fascinated by molecular biology. I was involved in several projects in the university laboratory of biotechnology, in which I characterized a new Lebanese strain of *Bacillus thuringiensis*, by cloning cry1A genes and studying the insecticidal Cry1A proteins they encoded. I subsequently performed a transcriptomic and proteomic analysis of the amniotic membrane and investigated the therapeutic and antimicrobial effects of this membrane in the treatment of eye diseases, at the Lebanese tissue bank. After a first experience in Lebanon, I moved to France, where I joined the Steroids/Wnt and Myelination team of Prof. Charbel Massaad at CNRS UMR 8194, Paris. I spent seven months investigating the role of the LXR in myelination and remyelination in the central nervous system. During this project, I investigated the mechanisms of central myelin gene expression regulation by the LXR, a nuclear receptor that binds oxysterols, oxidized forms of cholesterol. My work contributed to the publication of two papers highlighting the role of these receptors in the myelination process.

Research papers:

Liver X Receptors differentially modulate central myelin gene mRNA levels in a region-, age- and isoform-specific manner. *J Steroid Biochem Mol Biol* doi:10.1016/j.jsbmb.2016.02.032

Liver X receptors alpha and beta promote myelination and remyelination in the cerebellum. *Proc Natl Acad Sci U S A*. 2015 Jun 16;112(24):7587-92. doi: 10.1073

II. Graduate Career: The experience I gained from my early career confirmed my desire to expand my scientific knowledge and to work on my own personal research project in the framework of a PhD. I was awarded a Marie Curie PhD Scholarship and joined the laboratory of Prof. Yves Le-Bouc and Irène Netchine at INSERM U938, Paris. My PhD project concerned the identification of new molecular mechanisms related to human growth pathologies in Beckwith-Wiedemann and Silver-Russell syndromes, using a genetic and an epigenetic approach. During the first part of my PhD, I looked for molecular defects of the imprinting control region of the IGF2/H19 domain and studied the methylation profile of this region. This work led to the publication of two papers. During the second part of my PhD, I studied the methylation of imprinted regions and the regulation and role of protein-coding genes and long

non-coding RNAs (lncRNAs) from these regions in imprinting defects. MEG8, the function of which remains unknown, is one of these lncRNAs. By cloning the MEG8 gene and transfecting cells with a vector expressing this gene, I was able to show that MEG8 regulated the expression of several genes from the imprinted genes network. This work is the object of a paper that has been submitted to a good scientific peer-reviewed journal.

At the end of the third year of my PhD, I obtained funding from the “Fondation Maladies Rares” (Paris-France), for a project I designed for high-throughput sequencing in patients with rare diseases. I applied for a scholarship grant from the French Society of Pediatric Endocrinology and Diabetes to extend my PhD for a fourth year to enable me to complete this project, and I was awarded a Lilly grant. I was able to identify a new pathway underlying the pathologic phenotype. Using silencing and overexpressing assays, I revealed the functional mechanisms by which genetic defects of this pathway lead to the phenotype. A paper reporting these results is currently under review for publication in the *New England Journal of Medicine* (first author).

Research papers:

Abi Habib W, Brioude F, Azzi S, Salem J, Das Neves C, Personnier C, Chantot-Bastarud S, Keren B, Le Bouc Y, Harbison MD, Netchine I. 2016. 11p15 ICR1 Partial Deletions Associated with IGF2/H19 DMR Hypomethylation and Silver-Russell Syndrome. *Hum Mutat.* 2017 Jan;38(1):105-111. doi: 10.1002/humu.23131.

Azzi S, Steunou V, Tost J, Rossignol S, Thibaud N, Das Neves C, Le Jule M, Abi Habib W, Blaise A, Koudou Y, Busato F, Le Bouc Y, Netchine I. 2015. Exhaustive methylation analysis revealed uneven profiles of methylation at IGF2/ICR1/H19 11p15 loci in Russell-Silver Syndrome. *J Med Genet* 52(1):53–60.

Azzi S, Blaise A, Steunou V, Harbison MD, Salem J, Brioude F, Rossignol S, Abi Habib W, Thibaud N, Neves CD, Le Jule M, Brachet C, Heinrichs C, Bouc YL, Netchine I. 2014. Complex tissue-specific epigenotypes in Russell-Silver Syndrome associated with 11p15 ICR1 hypomethylation. *Hum Mutat* 35(10):1211–1220.

Abi Habib W, Azzi S, Brioude F, Steunou V, Thibaud N, Das Neves C, Le Jule M, Chantot-Bastarud S, Keren B, Lyonnet S, Michot C, Rossi M, Pasquier L, Gicquel C, Rossignol S, Le Bouc Y, Netchine I. 2014. Extensive investigation of the IGF2/H19 imprinting control region reveals novel OCT4/SOX2 binding site defects associated with specific methylation patterns in Beckwith-Wiedemann syndrome. *Hum Mol Genet* 23(21):5763–5773.

Review:

Azzi S, Abi Habib W, Netchine I. 2014. Beckwith-Wiedemann and Russell-Silver syndromes: From new molecular insights to the comprehension of imprinting regulation. *Curr Opin Endocrinol Diabetes Obes* 21(1):30–38.

I. Scholastic Performance

2008-2010	B.S in Biology and Biochemistry	Grade (/100)	Grade (ECTS)	2008-2010	B.S in Biology and Biochemistry	Grade (/100)	Grade (ECTS)
2010	English	76.25	B	2009	Practical work Genetics	76.5	B
2010	Molecular Biology	72.19	B	2009	Practical work organs and cell physiology	69.4	C
2010	Biomarketing	70	C	2009	Algorithm	79.8	B
2010	Neurophysiology	65.8	C	2009	Animal Anatomy	61.4	C
2010	Parasitology - Mycology	78.4	B	2009	Structural Biochemistry	73.1	C
2010	Plant physiology	63	D	2009	Organic chemistry	73	C
2010	Archery (Level 1)	90	A	2009	Basic Ecology	68.45	C

2010	Practical work molecular biology	79.02	B	2009	Probability and Statistics	72.2	C
2010	Practical work neurophysiology	81.8	B	2009	Volley Ball	90	A
2010	Practical work parasitology - mycology	78.67	C	2009	Practical work animal anatomy	73.4	D
2010	Practical work plant physiology	70.2	C	2009	Practical work structural biochemistry	76	C
2010	Microbiology	76.9	B	2009	Practical work organic chemistry	70.36	B
2010	Metabolic Biochemistry	55.5	E	2008	Plant biology	82.5	B
2010	Cell Biology	68.2	C	2008	Integral and Differential Calculation	80.8	B
2010	Elementary Gestures of Survival	75	C	2008	Expression - communication 2	65.2	C
2010	Paleontology	62.8	C	2008	Introduction to Genetics	82.2	B
2010	Comparative Physiology	75.18	B	2008	Introduction to Electricity	73.2	C
2010	Practical work microbiology	78.2	C	2008	Introduction to the environment	82.4	B
2010	Practical work metabolic biochemistry	76.8	C	2008	Introduction to the living world	70.1	C
2010	Practical work palaeontology	63.4	C	2008	Organization of the animal world	69.8	C
2010	Practical work comparative physiology	75.35	C	2008	Practical work plant biology	90	B
2010	Practical work virology-immunology	78	B	2008	Practical work General Chemistry	78	B
2010	Virology-Immunology	65.8	C	2008	Practical work Animal word	68.75	D
2010	Web Design	83.1	B	2008	Cell Biology and Reproductive Biology	73.8	B
2009	Biophysics	78.13	B	2008	General Chemistry	82.82	A
2009	Enzymology	94.8	A	2008	Expression - communication	77	B
2009	Fundamental Genetics	80.25	C	2008	Function of a real variable	73.2	C
2009	Photoshop	81.25	A	2008	Histology	70.5	C
2009	Organs and cell physiology	62.1	C	2008	Computer and office automation	83.5	B
2009	Professional project	82	C	2008	General Physics	82	B
2009	Molecular Biology Techniques	64.4	C	2008	Practical work general biology	54.48	E
2009	Practical work Enzymology	79	B	2008	Practical work General Physics	73.5	B
2011-2102	M.S in Functional Genomics and Proteomics	Grade (/100)	Grade (ECTS)	2011-2102	M.S in Functional Genomics and Proteomics	Grade (/100)	Grade (ECTS)
2012	Research internship in Paris (6 months)	84.5	A	2011	Physiopathological bases of human diseases	72.25	C
2012	Computer science	66	C	2011	Cell Biochemistry	82.2	A
2012	Cell Biology	60.7	C	2011	Development Biology	88.64	A
2012	Biotechnology	55	D	2011	Professional communication	72.5	B
2012	Culture of animal cells	84	A	2011	Drosophila Genetics	75	A
2012	In vitro culture	85	A	2011	Genetic engineering	79.8	A
2012	Epidemiology and statistics	62.5	C	2011	Cellular and Molecular Immunology	80.1	B
2012	Structural study of proteins	74	B	2011	Emerging Infectious Diseases	72.9	D
2012	Evaluation of molecular polymorphism	85	A	2011	Research internship in Beirut (3 months)	85	A
2012	Molecular Immunology	80	B	2011	Analytical techniques for biologists	65	C
2012	Protein engineering and proteome analysis	85	B	2011	Practical work cellular and molecular immunology	75	A
2012	Introduction to laboratory work	73.75	B	2011	Endocrinology	81.3	B
2012	Protein-protein and protein nucleic acid interactions	85	A	2011	Human Genetics and Population Genetics	65.7	C
2012	Research Methodology	75	C	2011	Microbiological Engineering	79	B

2012	Oncology	83	A	2011	Basic Immunology	77.05	A
2012	Organization of the genome in eukaryotes	85	B	2011	Informatics and Statistics for Biologists	70.1	B
2012	Genetic engineering tools and methods, animal and plant transgenic models	71	B	2011	Molecular markers	79	A
2012	Regulation of gene expression	85	A	2011	Pharmacology	54.6	E
2012	Structure and analysis of the genome, operation of databases	75	B	2011	Structure of Macromolecules	61.7	C
2012	Transcriptomes and DNA arrays	80	B	2011	Practical work microbiological engineering	89.2	A

B.S credits passed: 180 [A : 16 B : 70 C : 80 D : 8 E : 6]

M.S credits passed: 120 [A : 64 B : 26 C : 22 D : 4 E : 4]