John R **Clayton**

Scientist · Vector-borne Diseases

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"Nothing in biology makes sense except in the light of evolution"

Summary

I am a molecular biologist by training with 15 years of experience working on the genetics of disease vector mosquitoes. I have a PhD in Molecular Microbiology & Immunology from Johns Hopkins University. A California native, I was born and raised near Blythe, in the remote expanses of the Sonoran desert. Over the years, I've held more than a dozen positions in the US States of California, Georgia and Maryland as well as Heidelberg, Germany and Strasbourg, France. In addition to being a native speaker of English, I have a working knowledge of French, Spanish & German.

Education

Johns Hopkins Bloomberg School of Public Health — *Baltimore, MD*
Department of Molecular Microbiology & Immunology

Doctorate — *2003-2010*

Dissertation: *Transduction of Virulence Factors by Alphaviruses in Vertebrate and Invertebrate Models of Infection*

Johns Hopkins Bloomberg School of Public Health — *Baltimore, MD*
Department of International Health

Certificate, Vaccine Science & Policy — *2003-2005*

University of California — *Berkeley, CA*
Department of Molecular & Cell Biology

Baccalaureate — *1996-2000*

Emphasis: *Genetics & Development*

Work Experience

Université de Strasbourg — *Strasbourg, France*
Institut de Biologie Moléculaire et Cellulaire

Post-doctoral Researcher — *2011-2015*

As a fellow with the French *Institut national de la santé et de la recherche médicale* (INSERM), I successfully developed reagents to silence single alleles of polymorphic genes in *An. gambiae* to determine the contribution of each allele to susceptibility to *Plasmodium* infection in the mosquito. My other main research project involved the characterization of a transgenic strain of *An. gambiae* that produces small piwi-like RNAs derived from its integrated transgene locus, causing them to become hyper-susceptible to *Plasmodium* infection.

Johns Hopkins Bloomberg School of Public Health — *Baltimore, MD*
Department of Molecular Microbiology & Immunology

Pre-doctoral Researcher — *2003-2010*

My dissertation research largely involved the characterization of and acquired, sequence-specific anti-viral resistance phenotype observed in *Aedes aegypti* during Alphavirus infection. I also developed a recombinant, mosquitocidal Alphavirus expressing the pro-apoptotic gene *reaper* and evaluated its suitability as a potential biocontrol agent. Another project involved comparative analysis of the Bunyavirus virulence factor NSs in mice and mosquitoes.

European Molecular Biology Laboratory — *Heidelberg, Germany*
Kafatos Group

Post-baccalaureate Researcher — *2002-2003*

While working in the Kafatos lab I developed a transgenic strain of *An. gambiae* expressing a fluorescent reporter specifically in midgut epithelial cells that had been invaded by the malaria parasite. In parallel, I performed functional analysis of immunity genes and identified a role for the mosquito NF-κB-like transcription factor *REL2* during *Plasmodium* infection.

Centers for Disease Control & Prevention
Entomology Branch
Atlanta, GA

Emerging Infectious Diseases Fellow *2000-2002*

While an EID fellow at the CDC, I invented the breakthrough transformation method for *An. gambiae* still in use today. I also characterized the transgenic strains we obtained while working with both *P. vivax* and *P. falciparum* malaria parasites in a *BSL-2* environment. Field work opportunities included surveillance for West Nile Virus and assisting in CDC's emergency response during the 2001 Anthrax bioterror crisis.

University of California
Department of Integrative Biology
Berkeley, CA

Research Assistant *1998-1999*

While in the Brent Mishler's laboratory I evaluated the utility of RNA secondary structures to reconstruct deep phylogenies of green plants.

Languages

Spoken
- English ★★★★★
- French ★★★
- Spanish ★★★
- German ★★

Programming
- R ★★★★
- LaTeX ★★★★★
- Python ★★★
- Bash ★★★

Skills

Laboratory
- Expert at a wide array of molecular biology, biochemistry & genetics techniques

DNA/RNA/protein extraction/purification | PCR | qPCR | RT-PCR | SNP genotyping | Southern blot | RNA Blot | small RNA blot | SDS-PAGE | cell culture | cell transfection | immunofluorescence microscopy | plaque assay | micropipette design | microinjection | DNA sequence analysis | Sanger sequencing | Illumina DNA sequencing | small RNAseq | molecular cloning | gene synthesis | agarose gel electrophoresis | ultracentrifugation

Entomology
- Expert at all aspects of cultivating and maintaining colonies of *Anopheles* & *Aedes* mosquitoes

egg bleaching | vacuum hatching | larval feeding & splitting | pupal & adult sexing | adult cultivation | stock maintenance | single-pair mating | fluorescence screening of transgenic strains | midgut dissection | salivary gland dissection | ovary dissection | hemolymph extraction | blood feeding | genetic crossing

Software
- Expert user of the Microsoft Windows, Apple Mac OS X, Darwin/BSD Unix and Linux operating systems

Galaxy (workflow management system) | DNAStar Lasergene | Primer Express | Adobe Acrobat | Adobe PageMaker | Adobe Photoshop | Adobe Illustrator | Adobe Premiere | MS Word | MS Excel | MS Powerpoint | ffmpeg | TeXShop

Teaching Experience

Université de Strasbourg
Institut de Biologie Moléculaire et Cellulaire
Strasbourg, France

Master's student mentor *2011-2015*

Technical oversight of three master's level students with projects related to functional analysis of *Anopheles* genes during malaria infection and *in vivo* RNA interference in *Anopheles* and *Drosophila*.

Johns Hopkins Bloomberg School of Public Health
Department of Molecular Microbiology & Immunology
Baltimore, MD

Teaching Assistant *2005*

Graduate student instructor for Molecular Entomology. Lead exam reviews for students before midterm and final.

University of California
Berkeley, CA

Teaching Assistant *2000*

Undergraduate student instructor for Health and Medical ethics.

Honors & Awards

2004	**Scholarship**	Dr. Lloyd and Mae Rozeboom Scholarship in Medical Entomology	*Baltimore, MD*
2000	**Fellowship**	Emerging Infectious Diseases Laboratory Research Fellowship	*Atlanta, GA*
1999	**Travel Grant**	Deep Green Travel Grant for the XVI International Botanical Congress	*Berkeley, CA*
1996	**Scholarship**	Blythe Jaycees Scholarship	*Blythe, CA*

Training Courses

Ethics & Safety

- Chemical and biological waste disposal practices and safety training
- Radioactive isotope certification and safety training
- Ethical use of vertebrate animals in research training

Extracurricular Activities

Phi Kappa Tau Fraternity — *Berkeley, CA*

Member, Nu Chapter — *1997-2000*

As member of the fraternity, I held the positions of Scholarship Chair and Secretary as well as serving on the chapter Executive Committee.

The Daily Californian — *Berkeley, CA*

Production Intern — *1998*

Responsible for daily page layout

UC Berkeley Intercollegiate Bowling Team — *Berkeley, CA*

Member — *1996-1997*

Selected for the university bowling team as a first semester freshman

PVHS Class of 1996 — *Blythe, CA*

President — *1995-1996*

Elected to serve as Senior class president

PVHS Yellowjackets Golf Team — *Blythe, CA*

Varsity Letterman — *1993-1996*

Played on varsity golf team for four years

The Stinger — *Blythe, CA*

Editor — *1993-1994*

Features Editor and Advertisement Sales for our student newspaper

Extracurricular Employment

Skates on The Bay — *Berkeley, CA*

Waiter — *2000*

Waitstaff at a seafood restaurant in The Berkeley Marina

Mazzini Trattoria — *Berkeley, CA*

Busser — *1999-2000*

Service staff at a fine Northern Italian restaurant

Robinson Farms — *Blythe, CA*

Forklift Operator — *1996-1997*

Loaded tractor-trailers during melon season

Desert Security Farms — *Blythe, CA*

Laborer — *1994*

Tarped hay stacks

Blythe Drug Company — *Blythe, CA*

Sales Clerk — *1993-1996*

Duties included customer service, sales, inventory and deliveries

Double "R" Vending *Blythe, CA*

VENDING MACHINE STOCKER *1993-1996*

Filled vending machines for local soft drink vendor

Personal Interests

In my spare time, I like to travel and visit monuments, museums and parks. Activities I enjoy include bowling, cycling, golf, tennis, volleyball and poker. I also enjoy dining, cinema, theater and classical as well as contemporary live music performances.

Published Research

Lamacchia, Marina, **Clayton, John R**, Rui Wang-Sattler, Lars M Steinmetz, Elena A Levashina, and Stéphanie Blandin (2013). "Silencing of Genes and Alleles by RNAi in Anopheles gambiae". In: *Methods in Molecular Biology* 923.2, pp. 161–176.

Clayton, John R (2010). "Transduction of Virulence Factors by Alphaviruses in Vertebrate and Invertebrate Models of Infection". Dissertation. Johns Hopkins University, p. 193.

Clayton, John R and J Marie Hardwick (2008). "Apoptosis and Virus Infection". In: *Encyclopedia of Virology*. Ed. by BWJ Mahy and MHV Van Regenmortel. 3rd. Oxford: Academic Press. Chap. Apoptosis, pp. 154–162.

Lobo, Neil F, **Clayton, John R**, Malcolm J Fraser, Fotis C Kafatos, and Frank H Collins (2006). "High efficiency germ-line transformation of mosquitoes." In: *Nature Protocols* 1.3, pp. 1312–1317.

Meister, Stephan, Stefan M Kanzok, Xue-Li Zheng, Coralia Luna, Tong-Ruei Li, Ngo T Hoa, **Clayton, John R**, Kevin P White, Fotis C Kafatos, George K Christophides, and Liangbiao Zheng (2005). "Immune signaling pathways regulating bacterial and malaria parasite infection of the mosquito Anopheles gambiae." In: *Proceedings of the National Academy of Sciences of the United States of America* 102.32, pp. 11420–11425.

Grossman, Genelle L, Cristina S Rafferty, **Clayton, John R**, Theresa K Stevens, Odette Mukabayire, and Mark Q Benedict (2001). "Germline transformation of the malaria vector, Anopheles gambiae, with the piggyBac transposable element." In: *Insect molecular biology* 10.6, pp. 597–604.

Photographs

Enserink, Martin (2002). *Ecologists see flaws in transgenic mosquito*.

Jasny, Barbara R and Orla M Smith (2002). *Poster: MOSQUITO Anopheles gambiae*.

Enserink, Martin (2001). *Two New Steps Toward a 'Better Mosquito'*.

Patents

Levashina, Helena, Stéphanie Blandin, Fotis Kafatos, **Clayton, John**, Shin-Hong Shiao, and Luis Moita (2004). "Use of Thioester-Containing Proteins (TEPs) for triggering/inducing an immune response in mosquitoes of Anopheles against Plasmodium."

Research Presentations

Clayton, John R (2002). *Transgenesis in Anopheles gambiae*. Strasbourg, France.

Bendik, Jean, **Clayton, John R**, Andrew Hopkins, Lauren Singer, and Fernando Torres (2001). *EID Roundtable – Q and A Session From Current EID Fellows*. Atlanta, GA USA.

Clayton, John R and Mark Q Benedict (2001). *Germline Transformation of Anopheles gambiae with the piggyBac transposable element*. Atlanta, GA USA.

Courses Attended

Clayton, John R and Stéphanie A Blandin (2011). *Identifying Loci Controlling Resistance to Plasmodium Infection in the Mosquito Anopheles gambiae*. Heidelberg, Germany.

International Bioinformatics Workshop on Malaria Vectors, Sponsored by The Johns Hopkins Malaria Research Institute (2003). Baltimore, MD USA.

Posters

Clayton, John R, Julien Pompon, Elena A Levashina, and Stéphanie A Blandin (2014). *An immunodeficient transgenic Anopheles gambiae line to study the mosquito complement system*. New Orleans, LA USA.

Clayton, John R and J Marie Hardwick (2009). *Potent Acquired Antiviral Immunity in the Yellow Fever Mosquito Aedes aegypti*. Baltimore, MD USA.

Clayton, John R, Heidi L Galonek, Beth Lamos, Mary Vander-Maten, Pablo Irusta, and J Marie Hardwick (2006). *Effects of Drosophila reaper in Mosquitoes*. Big Sky, MT USA.

Benedict, Mark Q, **Clayton, John R**, and Genelle L Grossman (2001). *Mobility of piggyBac in Anopheles gambiae*. Barcelona, Spain.

Clayton, John R and John A Wheeler (1999). *Phylogenetic significance of rbcL secondary structures*. St. Louis, MO USA.

Scientific Meetings

Keystone Symposium: Genetic Manipulation of Insects (2004). Taos, NM USA.
American Society of Tropical Medicine and Hygiene 52nd Annual Meeting (2003). Philadelphia, PA USA.
Research Training Network Annual Meeting (2003). Leiden, The Netherlands.
EMBO/EMBL Conference on Science and Society "Infectious Diseases: Challenges, Threats and Responsibilities" (2002). Heidelberg, Germany.
Research Training Network Annual Meeting (2002). Kolymbari, Crete.
Cleveland Vector Encounter (2001). Cleveland, OH USA.
Keystone Symposium: Genetic Manipulation of Insects (2001). Taos, NM USA.