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What is a Geneticist?

Genetics is a field of biology that studies genes, heredity, and genetic variation. Genetic variation includes how genes become mutated or are involved in disease and aging. Environmental genetics examines how environmental factors interact with genes to cause disease, or enhance the adaptation of a species to its environment.

A geneticist is a science who studies genes, including how they are inherited, mutated, activated, or inactivated. They often study the role that genes play in disease and health. Environmental geneticists specialize in studying the interactions between genes and environmental factors that lead to adverse health effects, disease, and aging.

What Does a Geneticist Do?

Geneticists study the inheritance of traits. They may focus on these events at the molecular, organism, or population level. Some treat people with genetic disorders. Many environmental geneticists try to understand how environmental factors or exposures interact with genes to cause disease.

Environmental genetics often deals with epigenetics - the process by which parts of the genome can be ″turned on″ or ″turned off″ by external environmental factors. While many traits are set in stone by genes, others are more flexible and may or may not end up being expressed. For example, if you′re predisposed to a certain condition or trait due to your genetic makeup, you may or may not develop it on your own. However, being exposed to certain environmental factors such as diet and stress may cause that part of your genome to activate and be expressed. For example, genetics may make some people more susceptible to adverse health effects related to environmental factors like air pollution. Many environmental geneticists study how these interactions work.

Others study ecological genetics to expand our understanding of the role genetics plays in species′ adaptations to changing environments. Ecological geneticists use

population genetics for the conservation, management, and genetic improvement of species. For example, they calculate the reproduction and survival rates of a species or community. They use their knowledge of genetics to identify at-risk species and increase their genetic diversity. Some research how to genetically engineer plants that can adapt to climate change.

Regardless of specialty, most geneticists perform many of the same tasks. For example, they plan or conduct genetic research on gene expression and other topics. They keep laboratory notebooks that record their research methodology, procedures, and results. They review and interpret lab results using mathematical and statistical methods. Geneticists must keep up with scientific literature to learn about new methods, tools, and results in the field, and use that information to inform their own research. They often write grants or attend fundraising events to fund their research projects. They share their research results by writing academic journal articles and presenting at professional conferences.

Where Does a Geneticist Work?

Most geneticists find employment as research staff at university laboratories, government agencies, and hospitals. These jobs are available nationwide. Employment in the private sector is fairly rare.

Geneticists work a standard 40-hour week, usually in research laboratories and offices.

What Is the Average Geneticist Salary?

Geneticists earned an average annual salary of $72,720 in 2013. The full salary range is $34,590 - $124,760 annually, depending partly on location and type of employment. However, the National Human Genome Research Institute reports the median income for environmental geneticists specifically as $58,660 annually.

State	Median Salary
Alaska	$75,150
Arizona	$61,220
Arkansas	$68,810
California	$76,930

State	Median Salary
Colorado	$66,970
Connecticut	$82,810
District of Columbia	$93,610
Florida	$68,830
Georgia	$71,900
Hawaii	$72,250
Idaho	$63,150
Illinois	$81,520
Indiana	$67,730
Iowa	$53,780
Kansas	$70,240
Kentucky	$56,510
Louisiana	$66,200
Maryland	$89,030
Massachusetts	$77,840
Michigan	$61,970
Minnesota	$63,140
Mississippi	$64,770
Missouri	$68,810
Montana	$57,650
Nebraska	$69,780
Nevada	$65,550
New Hampshire	$76,300
New Jersey	$80,170
New York	$72,860
North Carolina	$68,880
North Dakota	$58,690
Ohio	$64,910
Oklahoma	$62,040
Oregon	$66,970

State	Median Salary
Pennsylvania	$72,880
Rhode Island	$82,750
South Dakota	$61,220
Tennessee	$62,550
Texas	$68,820
Utah	$63,150
Vermont	$63,150
Virginia	$77,360
Washington	$72,540
West Virginia	$68,890
Wisconsin	$61,680
Wyoming	$61,230

Table data taken from BLS (http://www.bls.gov/oes/current/oes191029.htm)

Genetics Jobs & Job Description

Geneticists may choose to teach post-graduate university studies, but many go into applied or theoretical research in order to consult in their area of specialization. They evaluate, test, and diagnose patients who have hereditary conditions, gene mutations, and genetic risks. Additionally, they serve as a resource to refer patients experiencing genetic complications to other medical professionals for direct treatment of a genetic condition. While jobs do vary, most geneticists find that the following list of tasks falls under their scope of practice:

- Test patients for gene or hereditary markers for a variety of risks and mutations
- Assess and consult with potential patients regarding genetic risks and potential mutations
- Review scientific literature and research to stay abreast of updates to the field
- Counsel patients hat have familial or personal histories of gene mutation
- Counsel patients who may have abnormal screenings or test results
- Help patients determine best treatment or planning course of action
- Consult with other healthcare providers, advocates, and community partners in order to educate and advocate for patients

- Assist colleagues and peers with research endeavors
- Assist with laboratory support and maintenance to ensure health and safety requirements are met

Senior geneticists often have broader responsibilities that include management of a lab or healthcare team. Such responsibilities often include:

- Consulting with policy-makers and other stakeholders regarding the use and interpretation of genetic information
- Advising outside agencies and researchers
- Creating scientific reports and articles for internal or external partners or the general public
- Engaging in the design and development of data collection and analysis techniques
- Providing input for software programs to support predictive modeling of gene expressions
- Planning, organizing, and participating in community outreach programs for people who have been impacted by genetic risk and mutation
- Ensuring that systems and methods of design, planning, data analysis, modeling and projections, associated documentation and development meet the goals of the workgroup and stakeholders
- Creating funding applications and reporting to senior administrators
- Overseeing team budgets, milestones, and systems
- Assisting and mentoring team members
- Establishing valid and efficient workgroup protocols
- Ensure standards of confidentiality are met in the healthcare setting

What Is the Job Demand for Geneticists?

The government predicts that job demand for geneticists as a whole will see little or no change (-2% to 2%), and that competition for basic research positions will be strong. Growth will likely be driven in part by advances in big data and hyper-computing that allow for analysis of large genetic and ecological datasets. Increased interest in the environment and an expanded focus on the medical aspects of genetics will also open up opportunities for environmental geneticists.

How Do I Get a Degree in Genetics?

Students interested in environmental genetics should pursue a major in genetics, biology, environmental science, or related disciplines. Courses in biology, population biology, ecology, chemistry, math, statistics, and computer science are all very important to a career in environmental genetics.

While a bachelor's degree can be sufficient for entry-level jobs, advancement and long-term research prospects will require advanced study and continued professional development. Independent research positions and faculty positions in academia generally require doctoral degrees.

Other Degrees Related to Geneticists

What Kind of Societies and Professional Organizations Do Geneticists Have?

- The Genetics Society of America (GSA) is a foremost professional association for geneticists around the world. GSA organizes several subject-specific conferences on a variety of species, as well as a general annual conference. It funds several awards and publishes multiple professional journals including Genetics, an authoritative journal first published in 1916. It also hosts an in-depth career center on its website.

- The American Genetic Association publishes the Journal of Heredity, organizes an annual meeting, funds an Evolutionary, Ecological, or Conservation Genomics (EECG) Research Award, and regularly reports genetic news focusing on wildlife species.

- The Society for Conservation Biology is dedicated to all scientific aspects of preserving biodiversity. It organizes annual, regional, and section meetings; supports regional chapters, sections, and working groups; publishes the journal Conservation Biology; hosts a job board, teaching and education resources, and advice for students; and Issues awards, including student awards.

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