

# BASIC MOLECULAR BIOLOGY MODULE 1: BASIC SCIENCE

AN ONLINE LEARNING COURSE  
AVAILABLE ON [WWW.CDC.TRAIN.ORG](http://WWW.CDC.TRAIN.ORG)

Sponsored by the  
Division of Laboratory Systems,  
Center for Surveillance, Epidemiology and Laboratory Services,  
Centers for Disease Control and Prevention



## DESCRIPTION

Molecular techniques have been widely used in clinical diagnosis, e.g., diagnosing disease, predicting disease course, and identifying infectious agents. This basic Molecular Biology course series will introduce the scientific background for molecular diagnosis, the principles of laboratory settings, and common methods.

This basic-level eLearning course, Module 1, provides information on the fundamental characteristics of DNA and RNA, nucleotide base-pairing rules, and the basic techniques and workflow applied in molecular diagnostics.



## AUDIENCE

This online course is designed for public health and clinical laboratory staff, and persons interested in the basic science of molecular biology.

## SPECIAL NEEDS

Course content is closed captioned, where applicable, and optimized for a screen reader.

## FREE REGISTRATION

- Locate the course online at [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining)
- Follow the link to register for the course in TRAIN
- If you have difficulty with the online registration process, please email [labtraining@cdc.gov](mailto:labtraining@cdc.gov)

## OBJECTIVES

At the conclusion of this course, the participant will be able to:

- Identify techniques in molecular diagnostics
- Identify the workflow of molecular diagnostics
- Predict the DNA sequences based on base-pairing rules
- Differentiate the characteristics of DNA and RNA
- Identify the process of DNA replication and RNA transcription

## CONTINUING EDUCATION

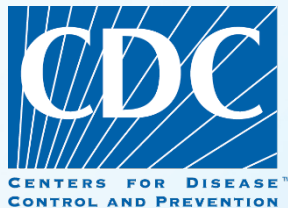
The Centers for Disease Control and Prevention, Division of Laboratory Systems is approved as a provider of continuing education programs in the clinical laboratory sciences by the ASCLS P.A.C.E.<sup>®</sup> Program. This course is approved for 1.0 contact hours. P.A.C.E.<sup>®</sup> course number: 288-001-19

**For a complete list of courses, visit [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining).**

# BASIC MOLECULAR BIOLOGY MODULE 2: LABORATORY PRACTICE

AN ONLINE LEARNING COURSE  
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## DESCRIPTION

Molecular techniques have been widely used in clinical diagnosis, e.g., diagnosing disease, predicting disease course, and identifying infectious agents. This basic Molecular Biology course series will introduce the scientific background for molecular diagnosis, the principles of laboratory settings, and common methods.

This basic-level eLearning course, Module 2, provides information on general laboratory practices. Topics covered include biosafety practices, laboratory area flow, and practices to minimize contamination.

## AUDIENCE

This online course is designed for public health and clinical laboratory staff, and persons interested in molecular biology laboratory practice.

## SPECIAL NEEDS

Course content is closed captioned, where applicable, and optimized for a screen reader.

## FREE REGISTRATION

- Locate the course online at [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining)
- Follow the link to register for the course in TRAIN
- If you have difficulty with the online registration process, please email [labtraining@cdc.gov](mailto:labtraining@cdc.gov)



## OBJECTIVES

At the conclusion of this course, the participant will be able to:

- Identify the general practices and biohazards associated with performing molecular biology procedures in BSL-2 and BSL-3 laboratories
- Explain the differences of the working areas needed to perform procedures in molecular biology
- Outline the unidirectional workflow used to minimize contamination in the laboratory
- Identify general decontamination practices in the molecular biology laboratory

## CONTINUING EDUCATION

The Centers for Disease Control and Prevention, Division of Laboratory Systems is approved as a provider of continuing education programs in the clinical laboratory sciences by the ASCLS P.A.C.E.® Program. This course is approved for 1.0 contact hours. P.A.C.E.® course number: 288-002-19

**For a complete list of courses, visit [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining).**

# BASIC MOLECULAR BIOLOGY MODULE 3: NUCLEIC ACID EXTRACTION

AN ONLINE LEARNING COURSE  
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## DESCRIPTION

Molecular techniques have been widely used in clinical diagnosis, e.g., diagnosing disease, predicting disease course, and identifying infectious agents. This basic Molecular Biology course series will introduce the scientific background for molecular diagnosis, the principles of laboratory settings, and common methods.

This basic-level eLearning course, Module 3, provides information on nucleic acid extraction. Topics covered include extraction method selection, basic extraction steps, and nucleic acid analysis.

## AUDIENCE

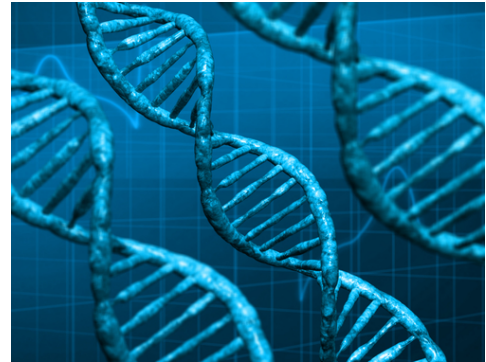
This online course is designed for public health and clinical laboratory staff, and persons interested in nucleic acid extraction.

## SPECIAL NEEDS

Course content is closed captioned, where applicable, and optimized for a screen reader.

## FREE REGISTRATION

- Locate the course online at [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining)
- Follow the link to register for the course in TRAIN
- If you have difficulty with the online registration process, please email [labtraining@cdc.gov](mailto:labtraining@cdc.gov)



## OBJECTIVES

At the conclusion of this course, the participant will be able to:

- Identify the four major factors used in selection of the nucleic acid extraction method
- Outline the three basic steps in nucleic acid extraction
- Explain how to analyze nucleic acid quantity and purity by spectrophotometry and gel electrophoresis
- Identify common problems in nucleic acid extraction

## CONTINUING EDUCATION

The Centers for Disease Control and Prevention, Division of Laboratory Systems is approved as a provider of continuing education programs in the clinical laboratory sciences by the ASCLS P.A.C.E.<sup>®</sup> Program. This course is approved for 1.5 contact hours. P.A.C.E.<sup>®</sup> course number: 288-003-19

**For a complete list of courses, visit [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining).**

# BASIC MOLECULAR BIOLOGY MODULE 4: PCR AND REAL-TIME PCR

AN ONLINE LEARNING COURSE  
AVAILABLE ON [WWW.CDC.TRAIN.ORG](http://WWW.CDC.TRAIN.ORG)

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## DESCRIPTION

Molecular techniques have been widely used in clinical diagnosis, e.g., diagnosing disease, predicting disease course, and identifying infectious agents. This basic Molecular Biology course series will introduce the scientific background for molecular diagnosis, the principles of laboratory settings, and common methods.

This basic-level eLearning course, Module 4, provides information on the principle of PCR and real-time PCR. Topics covered include PCR steps, PCR product analysis, real-time PCR characteristics, real-time PCR quantification, and roles of PCR controls.

## AUDIENCE

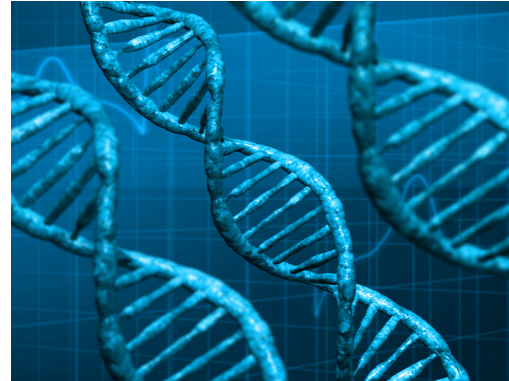
This online course is designed for public health and clinical laboratory staff, and persons interested in PCR and real-time PCR techniques.

## SPECIAL NEEDS

Course content is closed captioned, where applicable, and optimized for a screen reader.

## FREE REGISTRATION

- Locate the course online at [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining)
- Follow the link to register for the course in TRAIN
- If you have difficulty with the online registration process, please email [labtraining@cdc.gov](mailto:labtraining@cdc.gov)



## OBJECTIVES

At the conclusion of this course, the participant will be able to:

- Explain the basic steps involved in PCR
- Identify the components of PCR, reverse transcription PCR, and PCR product analysis
- Recognize the characteristics of real-time PCR
- Identify the techniques used to detect products in real-time PCR
- Differentiate the nucleic acid quantification processes used in real-time PCR
- Explain the roles of PCR controls

## CONTINUING EDUCATION

The Centers for Disease Control and Prevention, Division of Laboratory Systems is approved as a provider of continuing education programs in the clinical laboratory sciences by the ASCLS P.A.C.E.® Program. This course is approved for 1.0 contact hours. P.A.C.E.® course number: 288-004-19

**For a complete list of courses, visit [www.cdc.gov/labtraining](http://www.cdc.gov/labtraining).**