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of NORTH CAROLINA
at CHAPEL HILL

Introduction to Genomics

May 24, 2018

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Outline for Introduction to Genomics

- What is Genomics?
- Genome Sequencing
- Genotyping

What is Genomics?

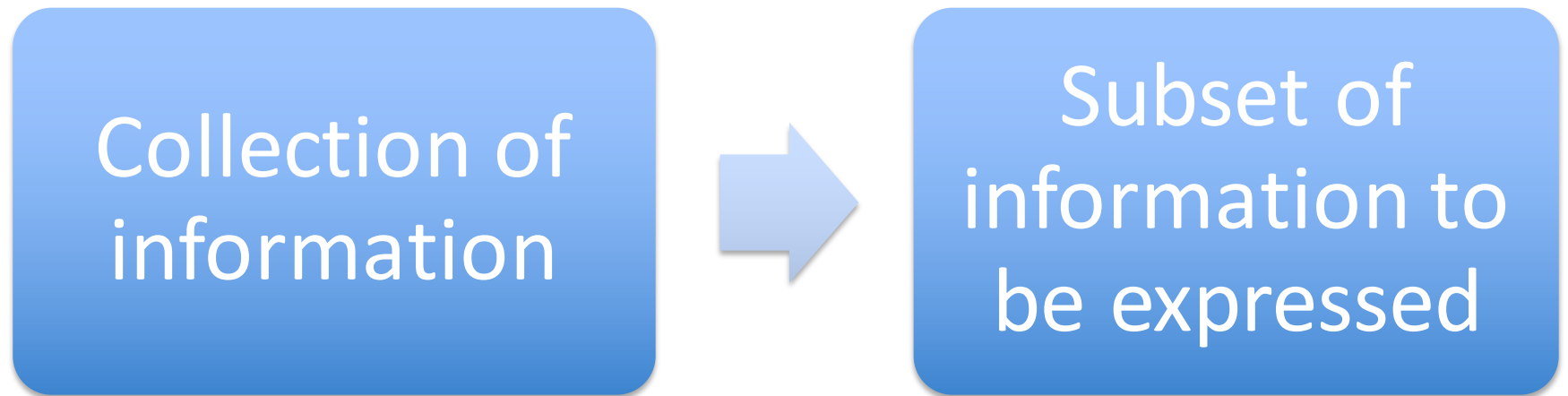
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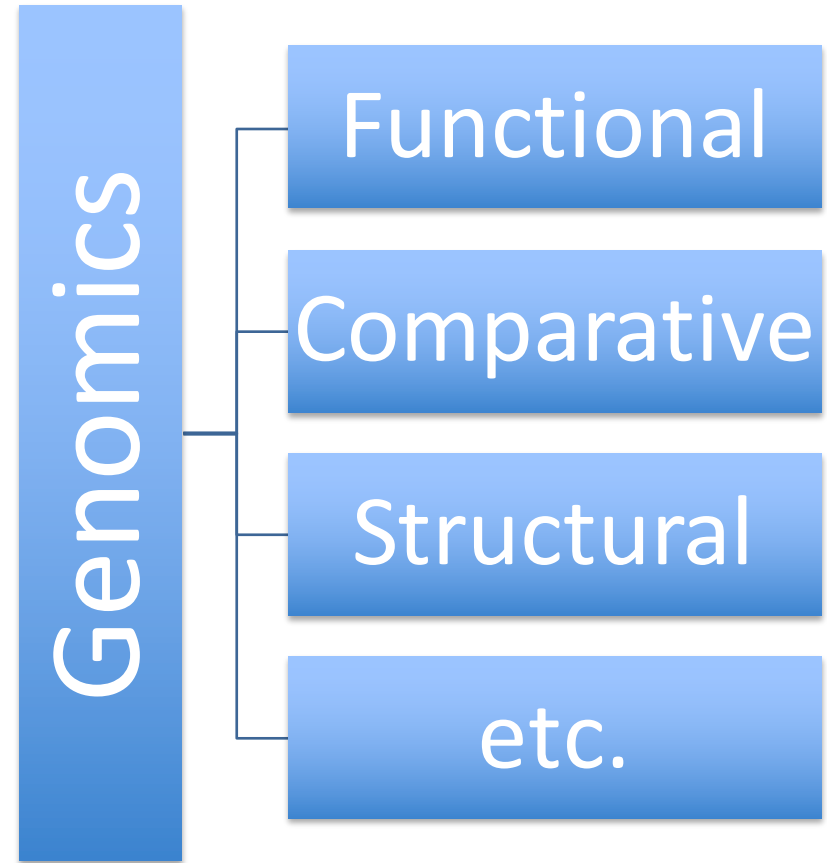


Problem



Definition of Genomics

- Large-scale study of groups of genes within one organism or between multiple organisms



Genome Sequencing

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What is a genome?

>NC_000017.11:c43125483-43044295 Homo sapiens chromosome 17, GRCh38.p12 Primary Assembly

GTACCTTGATTTCGTATTCTGAGAGGCTGCTGCTTAGCGGTAGCCCCTTGGTTTCCGTGGCAACGGAAAA
GCGCGGGAATTACAGATAAATTA AAACTGCGACTGCGCGGCGTGAGCTCGCTGAGACTTCCTGGACGGGG
GACAGGCTGTGGGGTTTCTCAGATAACTGGGCCCCTGCGCTCAGGAGGCCTTCACCCTCTGCTCTGGGTA
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CGTCGGCTGGTCATGAGGTCAGGAGTTCCAGACCAGCCTGACCAACGTGGTGAAACTCCGTCTCTACTAA
AAATACAAAAATTAGCCGGGCGTGGTGCCGCTCCAGCTACTCAGGAGGCTGAGGCAGGAGAATCGCTAGA
ACCCGGGAGGCGGAGGTTGCAGTGAGCCGAGATCGCGCCATTGCACTCCAGCCTGGGCGACAGAGCGAGA
CTGTCTCAAAACAAAACAAAACAAAACAAAACAAAACACCGGCTGGTATGTATGAGAGGATGGGACCT
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GCTGCCGGCAGGGATGTGCTTGAGGAGGATCCAGAGATGAGAGCAGGTCACTGGGAAAGGTTAGGGGCGG
GGAGGCCTTGATTGGTGTGTTGGTTTGGTCGTTGTTGATTTTGGTTTTATGCAAGAAAAAGAAAACAACCAG
AACATTGGAGAAAGCTAAGGCTACCACCACCTACCCGGTCAGTCACTCCTCTGTAGCTTTCTCTTTCTT

How do we sequence a genome?

- Sanger sequencing
- Next Generation Sequencing (NGS)
 - Illumina Sequencing by Synthesis





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Genotyping

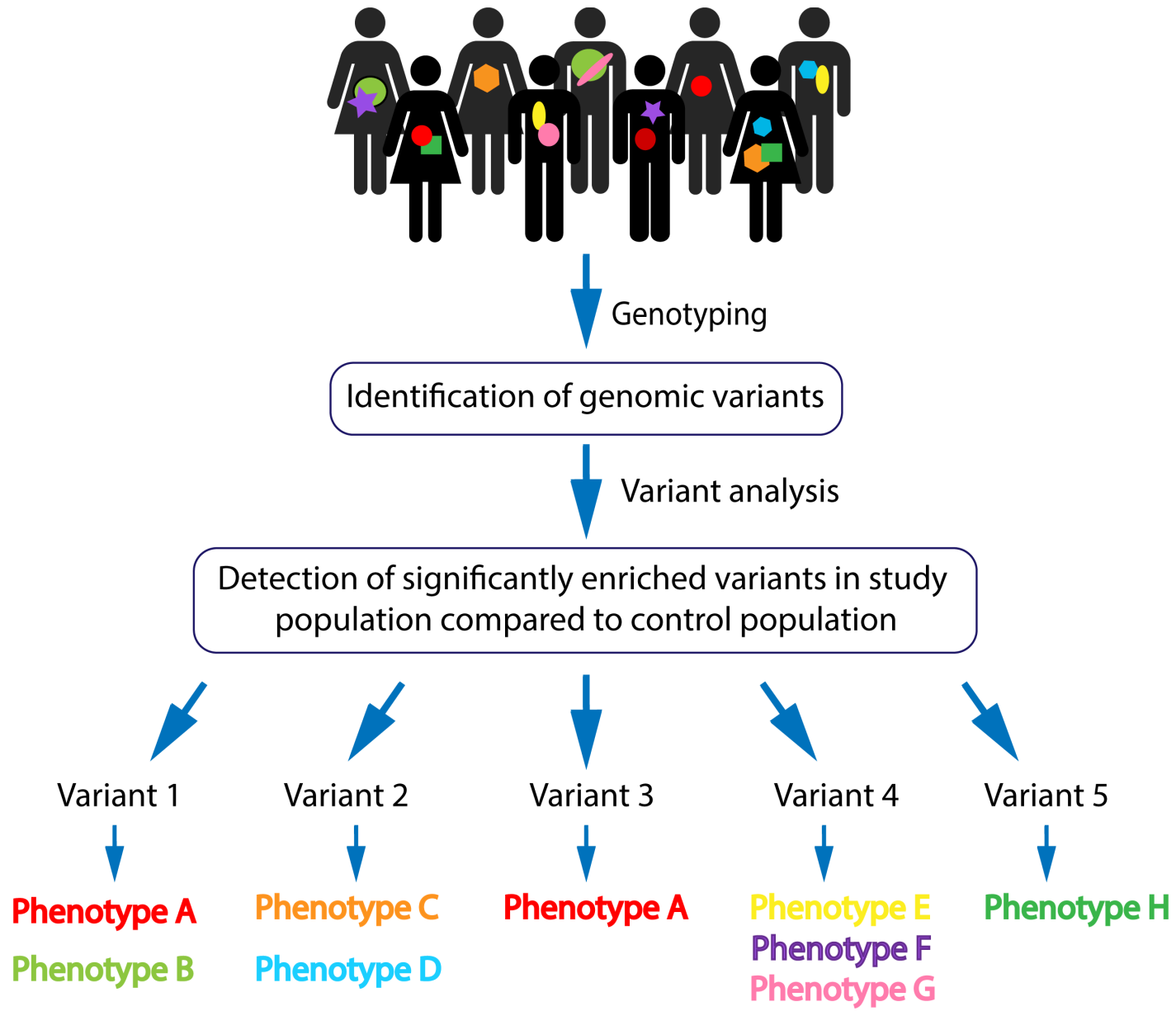
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Genotyping



Any Questions?

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Introduction to Genomics: Demo + Hands-On Exercise

Next Class

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Demo

- Mutating RNA in Matlab
 - Visualizing RNA folds
 - Comparing mutated strands to wild type strands