Next generation sequencing applications

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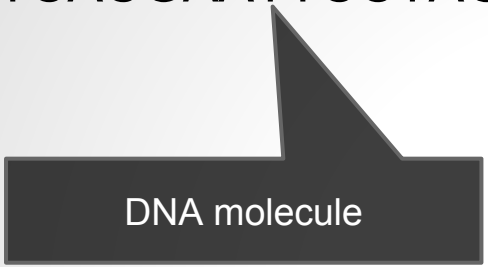
Basic idea:

1. Convert molecule to DNA
2. Apply 2nd generation sequencing

Exome sequencing

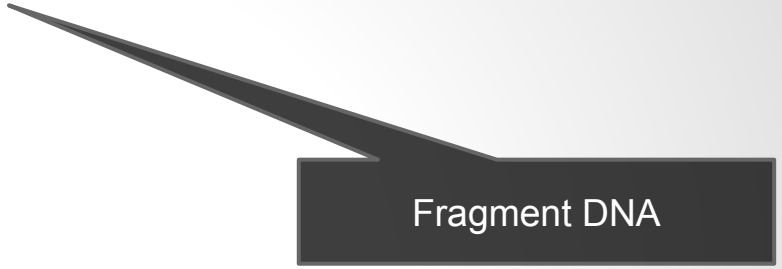
ATGGGAATTCACGAATTCCTAGACCTGCCCCGGAAACCTACCGCCGCG

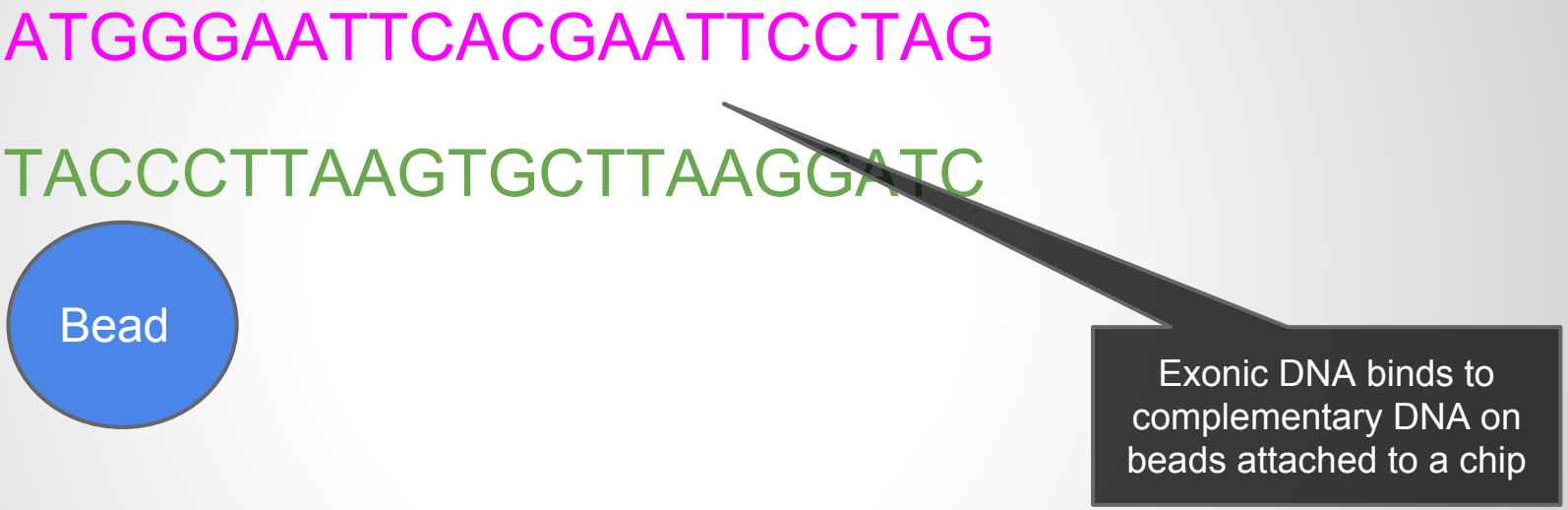


ATGGGAATTCACGAATTCCTAGACCTGCCCCGGAAACCTACCGCCGCG

ACCTGCCCCGGAAACCTACC GCCGCG

ATGGGAATTCACGAATTCCTAG

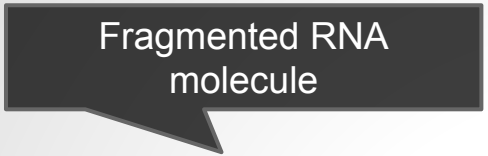



ATGGGAATTCACGAATTCCTAG
TACCCTTAAGTGCTTAAGGATC
Bead
Exonic DNA binds to complementary DNA on beads attached to a chip

ATGGGAATTCACGAATTCCTAG

Only sequence exonic parts of the DNA

RNA-seq



AUGGGAAUUCACGAAUUCCUAGAAAAAAAAA

AUGGGAAUUCACGAAUUCCUAGAAAAAAAAA

Capture mature RNA by poly(A) tail

AUGGGAAUUCACGAAUUCCUAGAAAAAAAA

Reverse transcribe into complementary DNA (cDNA)

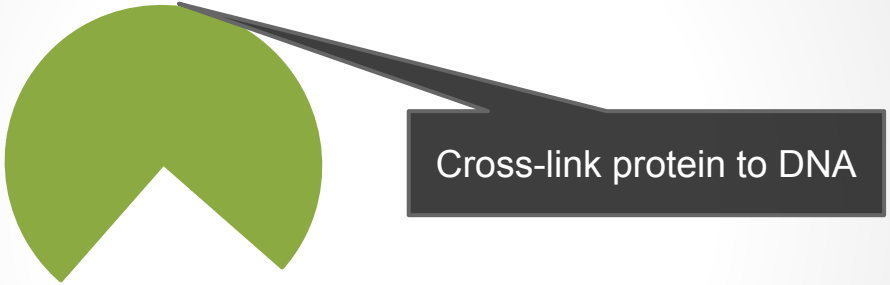
ATGGGAATTCACGAATTCCTAG

AUGGGAAUUCACGAAUUCCUAGAAAAAAAA

ATGGGAATTCACGAATTCCTAG

Chip-Seq

GGAACCATGGGAATTCACGAATTCCTAACCATTA



CATTA

GGAA

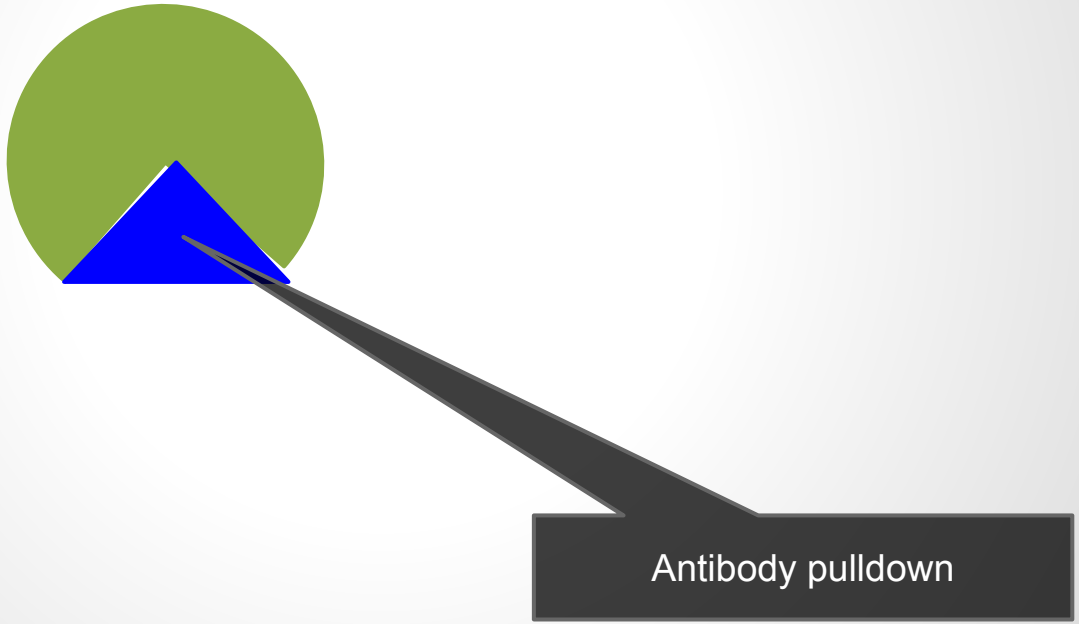
CCATGGGAATTCACGAATTCCTAAC

Fragment DNA

CATTAG

GGAA

CCATGGGAATTCACGAATTCCTAAC



CCATGGGAATTCACGAATTCCTAAC

Bisulfite sequencing (methylation)

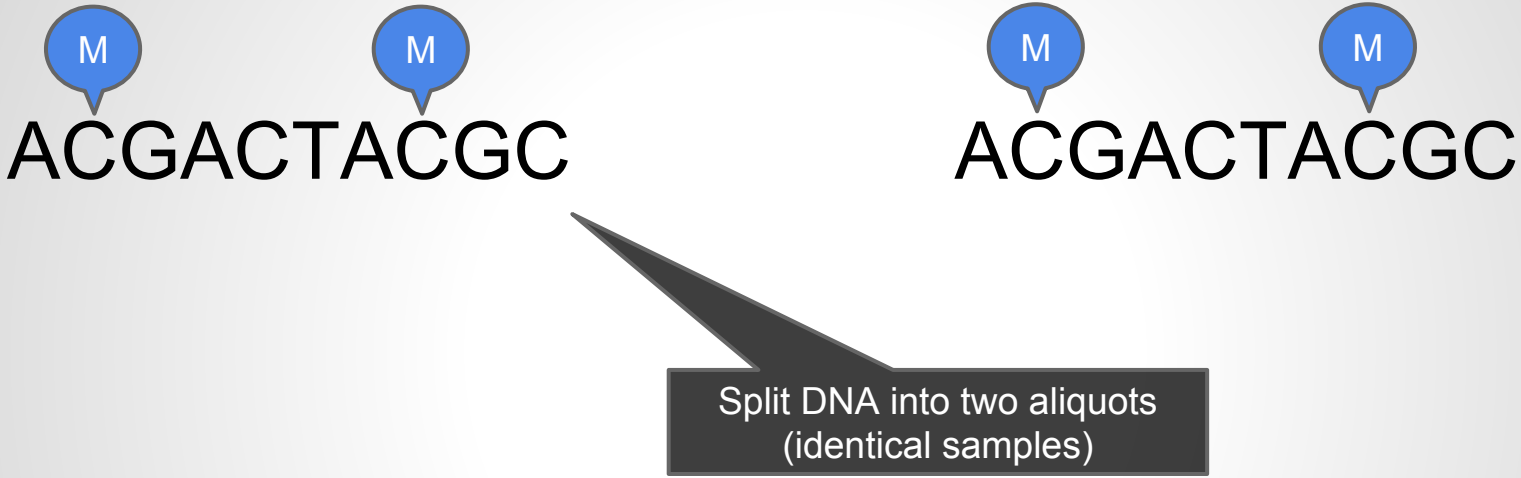


Image adapted from: http://www.atdbio.com/content/20/Sequencing-forensic-analysis-and-genetic-analysis

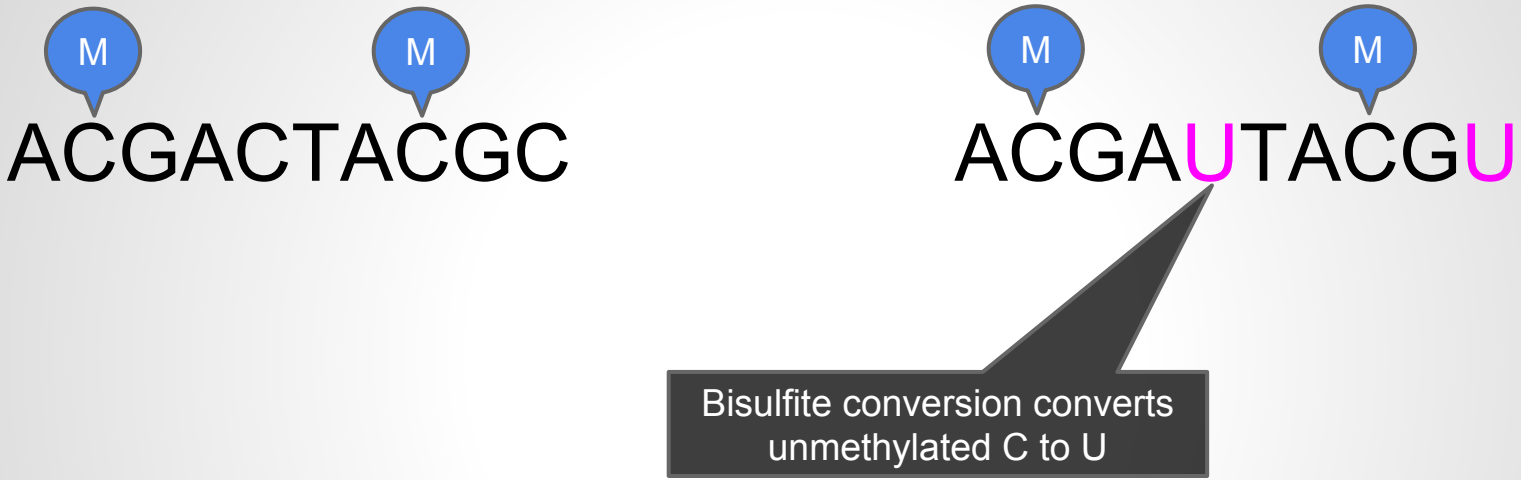


Image adapted from: http://www.atdbio.com/content/20/Sequencing-forensic-analysis-and-genetic-analysis

ACGACTACGC

ACGAUTACGU

Sequence and compare

Image adapted from: http://www.atdbio.com/content/20/Sequencing-forensic-analysis-and-genetic-analysis