

MOLECULAR GENETICS

1. DNA Technology

i. DNA Probes - Identifies any complementary DNA Sequences

ii. DNA Sequencing Methods - Identification of Mutations

iii. Restriction Enzymes - Cut DNA consistently only at Specific Sequences

iv. Positional Cloning - Strategies using Genetic Markers

v. Fluorescence In Situ Hybridization (FISH) - Direct visualization of Relationship of Genes to one another in the Nucleus

2. Gene Therapy

Introduction of Gene Sequence into a Cell to

modify the Cell Behavior in a relevant fashion • Uses - To correct a Genetic Mutation (Cystic Fibrosis), to kill a Cell (Cancer) • Gene may be introduced using a Virus (usually a Retrovirus or Adenovirus) or by means of Lipid or Receptor Targeting

3. The Human Genome Project

- To create a single linear Map of the Human Genome, with each Coding Gene defined & sequenced

Agencies included - UNESCO, HUGO etc.

Primary Goal - To determine the sequence of Chemical Base Pairs which make up DNA & to identify approximately 25000 Genes of human genome (later found 20500)

secondary Goal - To understand Human Genome & complete a Map of all findings

Project began in - 1990 headed by James

D Watson • April 2003 - announcement of essential complete genome • Still going on & preliminary count indicates 19000 to 20000 genes in human genome

4. Human Genome Diversity Project (HGDP)
- Aimed at - understanding the Human Evolution & mapping the DNA that varies between Human Ethnic Groups •

5. Genome - Based Research & Population Health (G Rahn)