

BIOTECHNOLOGY AND GENETIC ENGINEERING – A KEY TO BIO- ECONOMY

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1.0 INTRODUCTION

1.1 What is Bioeconomy or biotechonomy?

Refer to all economic activities derived directly or indirectly focusing on biotechnology.

1.2 What is important here?

- The World is going Bio-Economy way
- Next Global Biomanufacturing summit is 18th -20th 2015 at Orange County CA, USA

1.3 Bioproduction and provision of Service

General overview of Goods and service

- Direct production - drugs, vaccines, food, feed, biofuel, pesticides, bioplastics, biofuel, biorefineries, nanobiotechnology, bio-weaponary
- Diagnostics for human, animals and plants consultancies, waste biodegradation, teaching and research, regulators of biotechnomy, bioinformatics data repository, bio- data mining, policy makers (laws and policies) and forensics, among others

1.4 Many opportunities yet unemployment????

Gaps / Weakness

- Need to convert Biotechnology into real goods and service (Generate income and jobs)
- Identify opportunities from Biosafety
- BT application is Capital intensive (at knowledge and hardware levels)

1.5 Objective

- a) Illustrate that Bio-technology is key- to bioeconomy .
- b) Demonstrate practicability in bioeconomy

Physics



Biophysics



MRI

X-RAY

1.5 Who own Bio-economy

- America
- Europe
- Asian
- Why is Africa?

1.6 Bioeconomy Jobs un exploited area

- Direct Product development e.g. Biopolymer
- Indirect product development – Tools used in Bioeconomy
- Direct service delivery – Diagnostics
- Indirect service delivery - Forensics

2.0 Direct production of goods

2.1 Anti allergies

a) Products

- 1) Allergens to treat
allergy e.g. anti allegergy
Spray
- 2) PPE- gloves, mouth
masks etc



2.2 Biofuel production





- Making biofuel

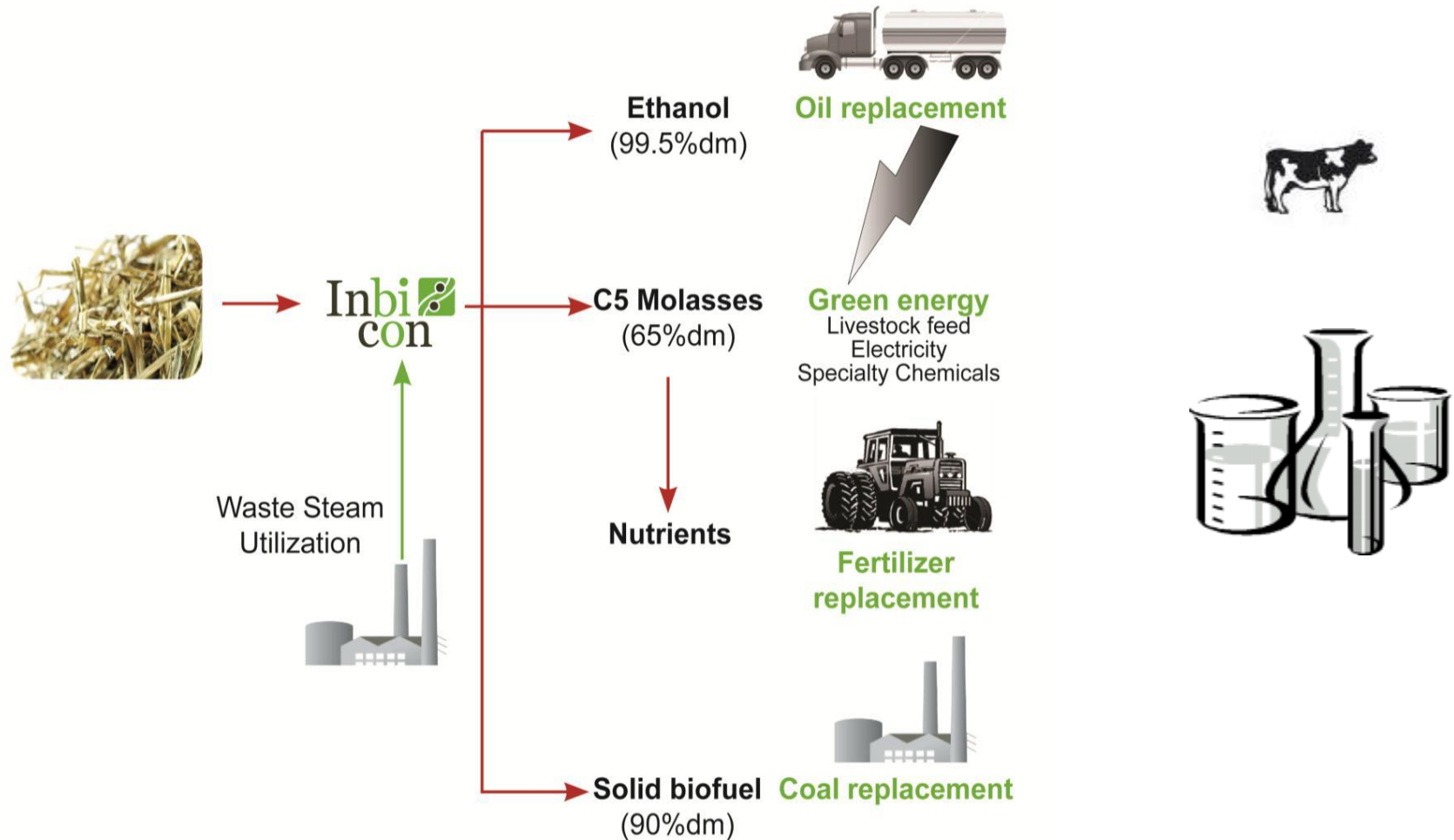


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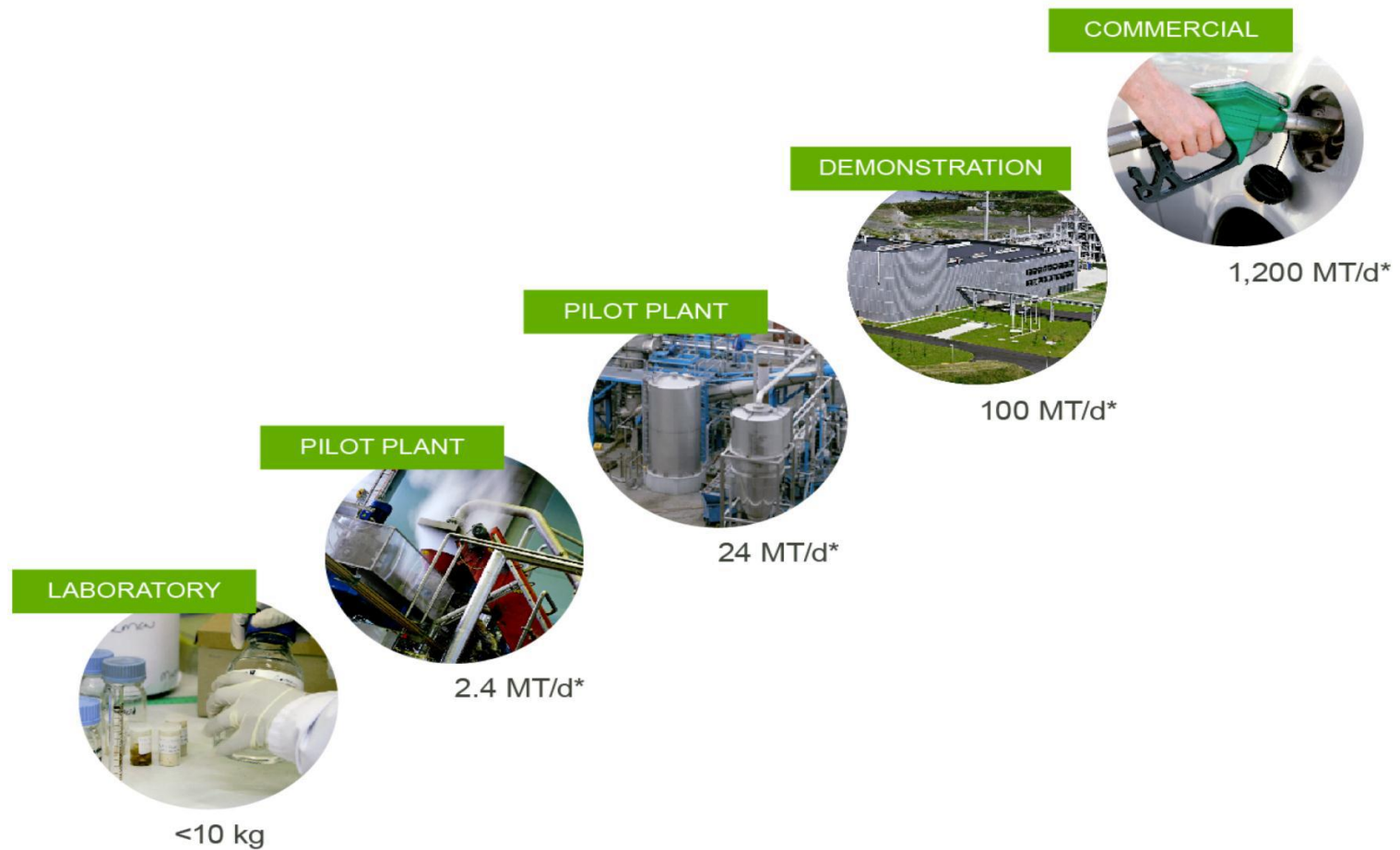
Processing lignocellous materials

2.4 System in Biofuel manufacturing



The Path to Cellulosic Ethanol

- Value addition chain



2.5 Bioeconomy and industries

2.5.1 Biofuel production



2.6 Bioplastics



2.7 Tissue Culture

5.1 Plant Tissue Culture

Example : Banana tissue culture

- One tissue culture banana is Khs70
- A 100 banana plant for each of average of 10,000,000 farmers means 7,000,000,000

BT cotton

- Will save this country from cost of pest and environmental pollution.

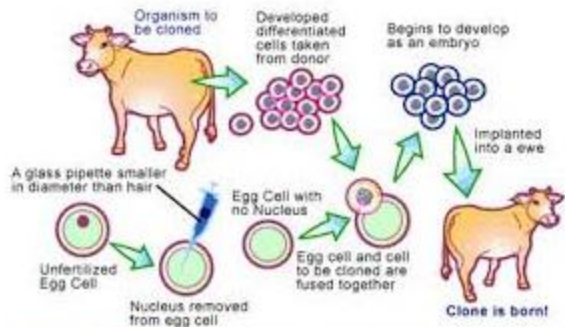
3. Indirect products

3.1 Jobs in hardware reagents etc production



3.2 Animal tissue culture

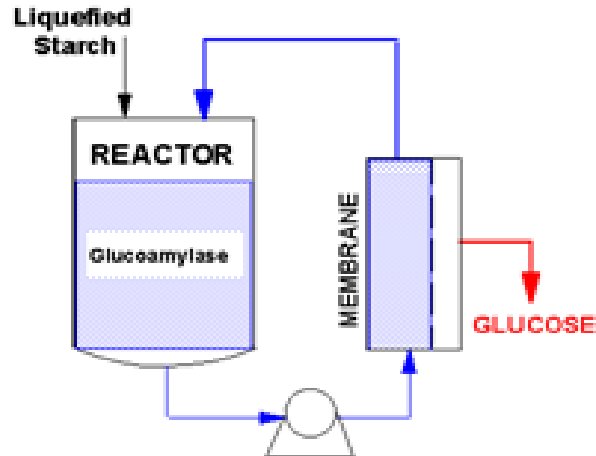
- Opportunities



4. Bioeconomy and Food

4.1 Dextrose production

A Better Way to Produce Dextrose (Glucose) from Starch



4.2 Fermentation bioprocess

- Process



5. Medical and pharmaceutical Medicine



Teaching Pharmacist
of fungal product
extraction can be
a money earning
activity



Could Microbiology
doing microbial
farming

Source fungi and fungi production

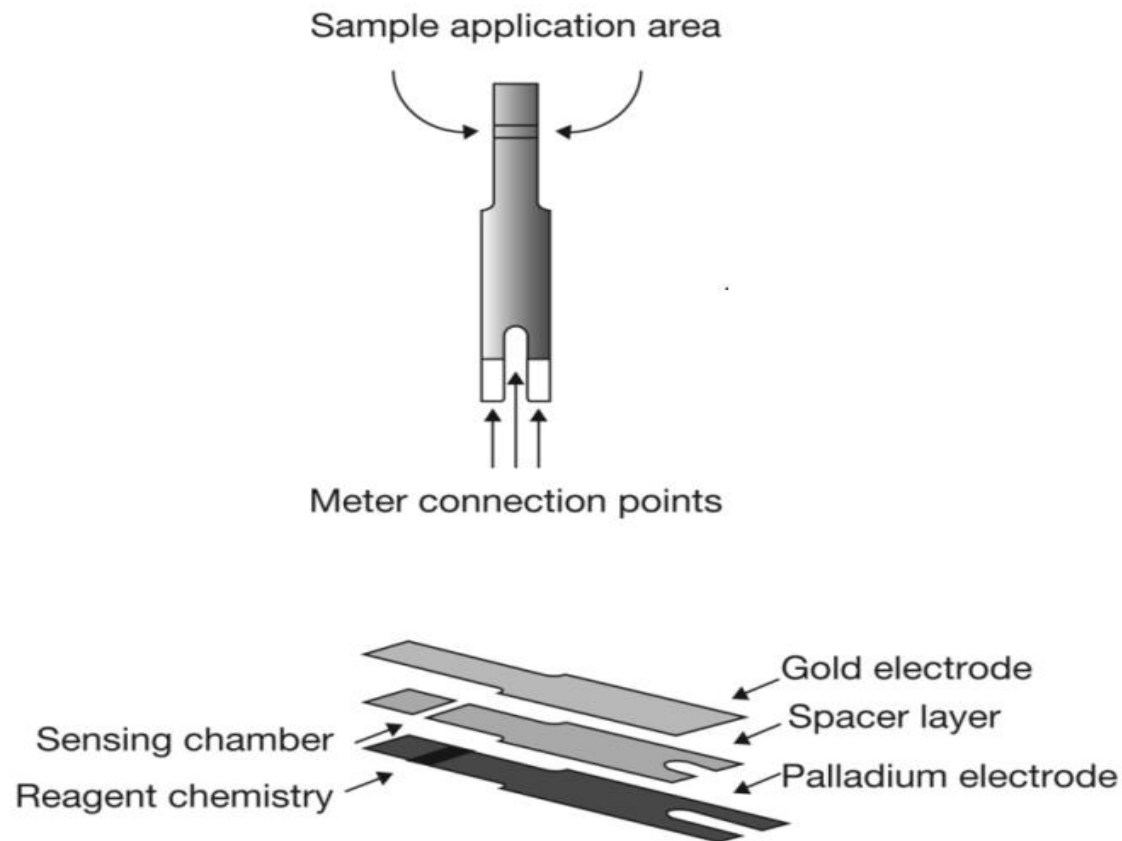
Provide penicillium



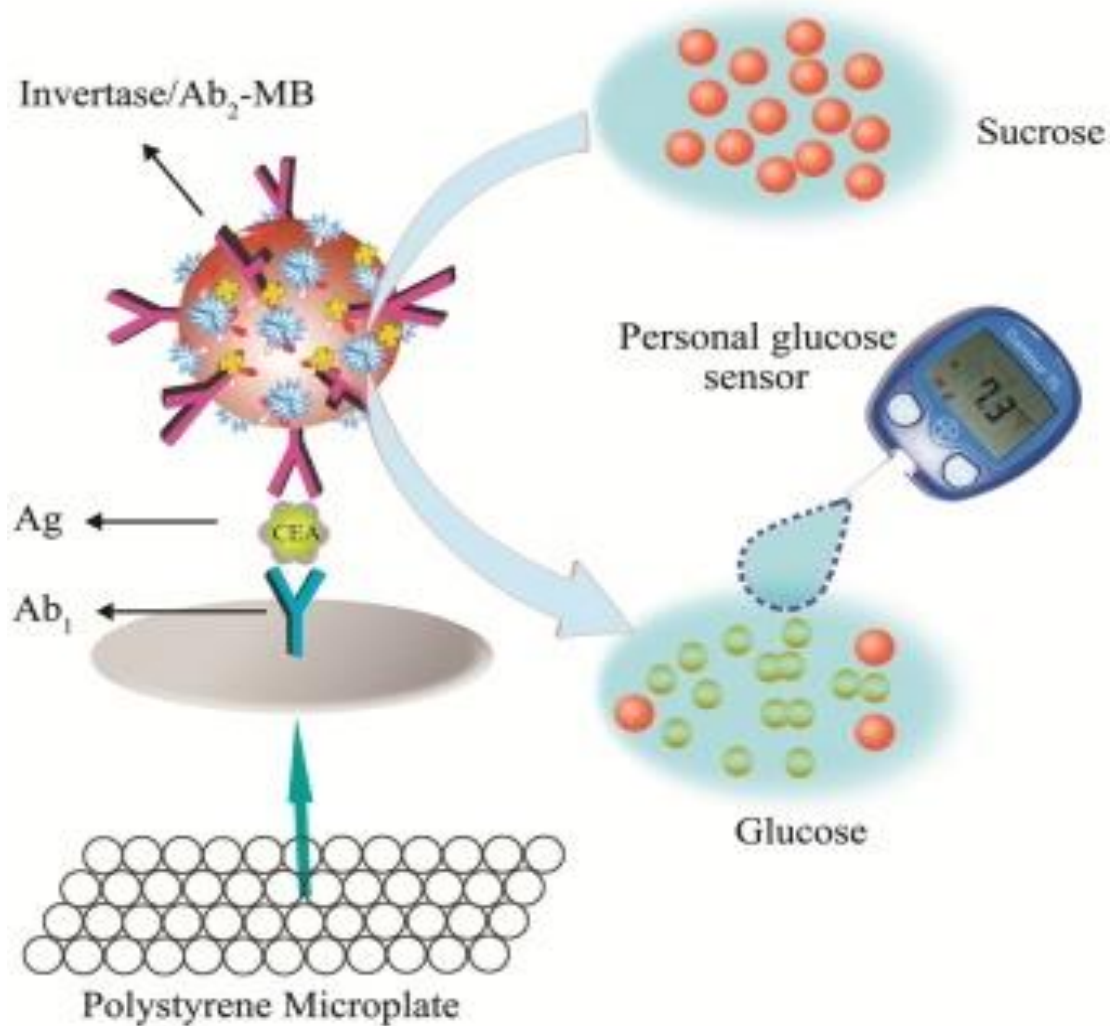
Agricultural student would benefit more by will growing and extracting fungal product .

5.2 Disease management

a) Making of Glucometer strips for monitoring blood sugar levels



b) Managing Blood sugar levels



6. Other indirect opportunities

- Making of laboratory hardware (equipment) e.g. MRI, scanning , X-ray machine, microscopes, etc
- Soft ware e.g. making the soft to run the machines

7.0 Bio-economy in service delivery

7.1 Biosafety services e.g. NBA

7.2 DNA tools

- Direct service

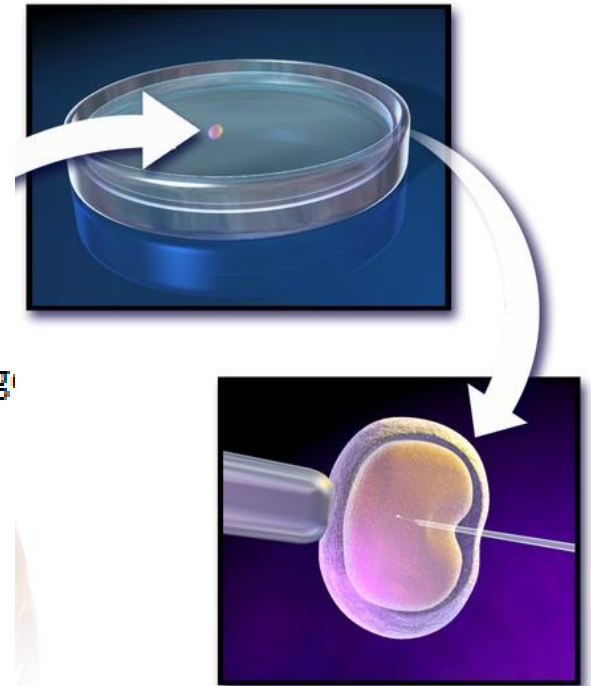
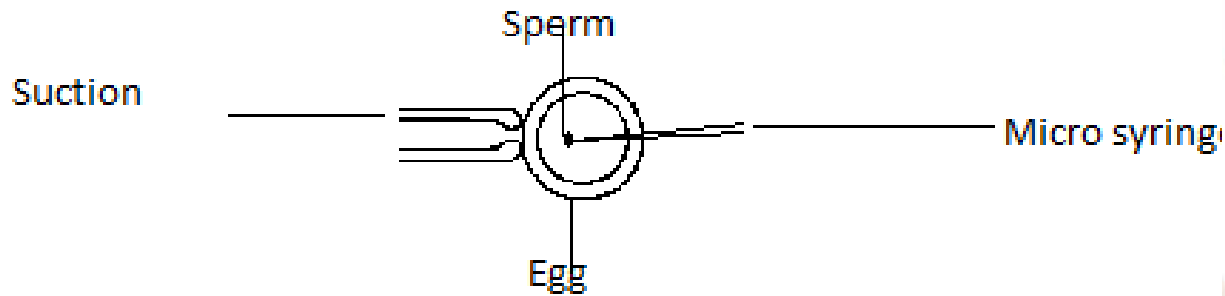
Example DNA sequencing, aided
reproduction e.t.c

- Indirect service : forensics for legal use

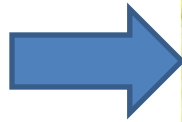
7.3 Aided Reproduction

IVF

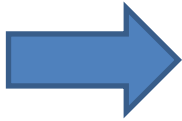
Artificial fertilization



7.4 Aided reproduction (AR)



Can change this



to this Kind of a family

7.5 Gene Sequencing

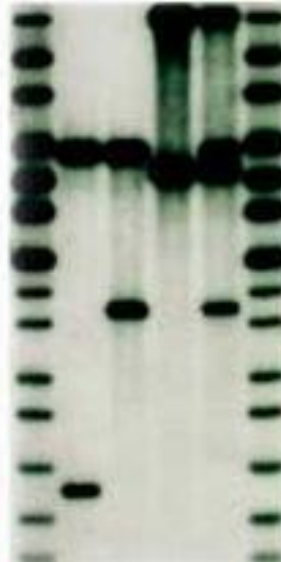
- To sequence one base pair of DNA is amount 0.5 of a dollar
- Even the little sequencing done in Kenya we export million of dollars

7.6 Paternity testing



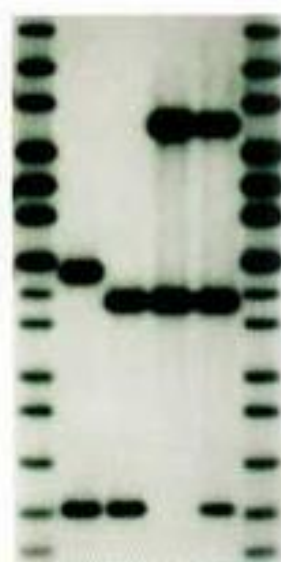
Paternity Exclusion

LADDER
Mother
Child
Alleged Father
C/AF Mix
LADDER



Paternity Inclusion

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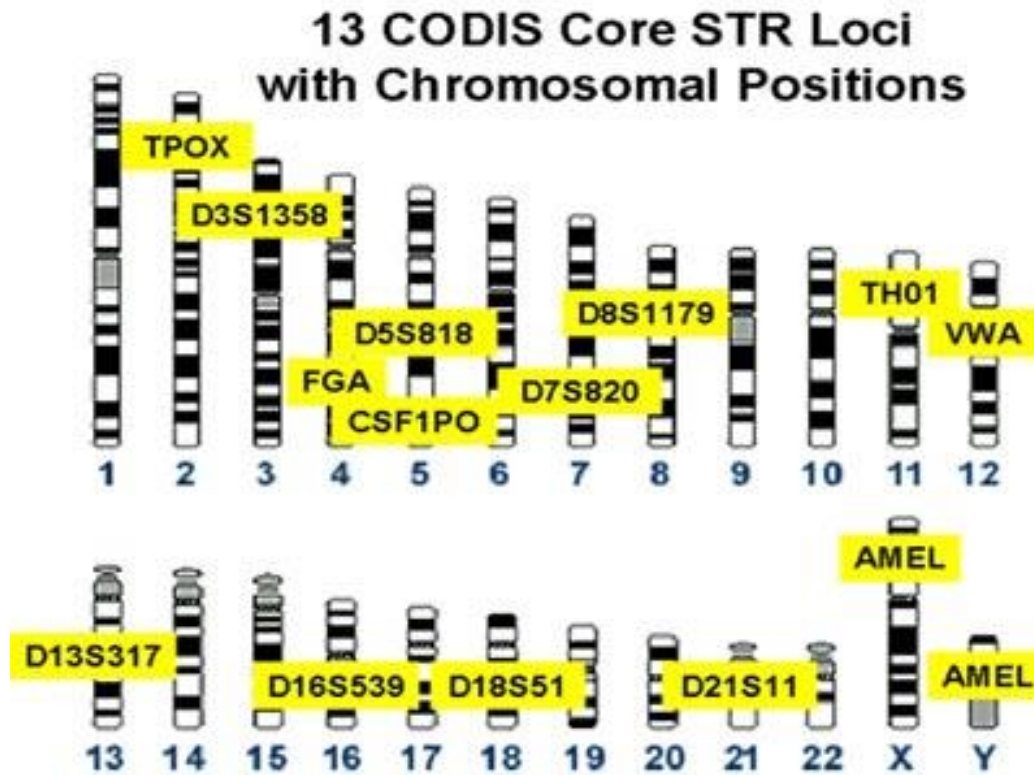


7.7 Forensic

- Dealing with crime
- Cultural dispute resolution become easy to control crime remotely .

Use of DNA in crime prevention

- Combined DNA Index System (**CODIS**)



8. Success story

Total equity of some selected companies

Company	2013 US \$	2012 US\$
Qiagen	2,723,871,000	2,724,363,000
Sigma	610,806,000	682,527,000
Genetech	6,346,923,271	5,994,566,475
Monsantos	7,653,000	7,045,000

THANK YOU