

# Glossary of Genetic Terms



**Chromosome** - a pair of DNA molecules combined with protein and visible to light microscopy. Human cells have 22 pairs of autosomes plus a pair of sex chromosomes.

# Glossary (continued)



Gene - segment of DNA that codes for the protein product which determines one's traits or characteristics. There are between 20,000 to 25,000 genes on the 22 autosomes and the pair of sex chromosomes.

# Glossary (continued)




**DNA - molecule which encodes genetic information. It is a double-stranded, helical molecule in which two strands are complimentary in sequence and are held together by numerous weak bonds (A-T and C-G) 3 billion base pair of DNA**



# *DNA Molecule* **(A-T C-G)**

Double Stranded Helical  
Molecule Held Together by  
Weak Bonds



# Elements of Most Diseases



1. Environmental component...
2. Dietary component...
3. Genetic component...

# Misspelled Genes



BRAC1 -(breast cancer) this gene was mapped in 1990 and identified in 1994. Women with this genetic make up have a 50% risk of cancer by the age of 50 and a life time risk of 85%. 1 in 200 women at risk... 1 in 40 Jewish women at risk...

# Misspelled Genes



Cystic Fibrosis - once the gene was identified then the misspelling was pursued. It took ten years of sorting two million base pair of DNA before the misspelling was found to be in three base pairs of DNA...

# Complete Decoding of Chromosome 22



1. Chromosome 22 is one of the smallest
2. Approximately 545 genes on #22...
3. 35 of these genes are implicated in heart defects, schizophrenia, mental retardation, birth defects, immune system and certain cancers including leukemia...

# Complete Decoding of Chromosome 21



1. Chromosome 21 is another of the smallest...
2. Approximately 225 genes on 21...
3. These genes are implicated in Down's Syndrome, Alzheimer's & Lou Gehrig's disease...

# Sample Decoded Chromosomes



- 5 – one of the largest yet low gene density (923)...
- 6 – large (2,190 genes) immune genes...
- 7 – 1,150 genes, cystic fibrosis, deafness, cancer...
- 9 – 1,200 genes, interferon genes, myeloid leukemia...

# Decoded Chromosomes



- 10 – 1357 genes, epilepsy, obesity, certain cancers...
- 16 – 850 genes, breast & prostate cancer, kidney, Crohn's disease...
- 17 – second highest gene density, 1,300-1500 genes, BRACA 1, bladder cancer...
- 19 – 1,300-1,700 genes, atherosclerosis, diabetes mellitus...

# Genetics/Edenic Judgment



1. All physical evil in our world has come from man's moral rebellion against God.
2. Genetic anomalies have come as a result of God's judgment on sin.
3. Genetic depravity is real and its increment continues to be located in the genetic pool.

# Key Ethical/Theological Question



Given the creation mandate, ***“have dominion ... and subdue,”*** should man be probing for reversal and control to be found in genetic medicine?

# Major Ethical Issues



1. Genetic Testing & Confidentiality
2. Prenatal Genetic Testing (chorionic villus sampling, maternal serum screening, amniocentesis.)
3. Genetic Counseling
4. Behavioral Genetics (reductionism)
5. Genetic Intervention

# Genetic Markers Testing



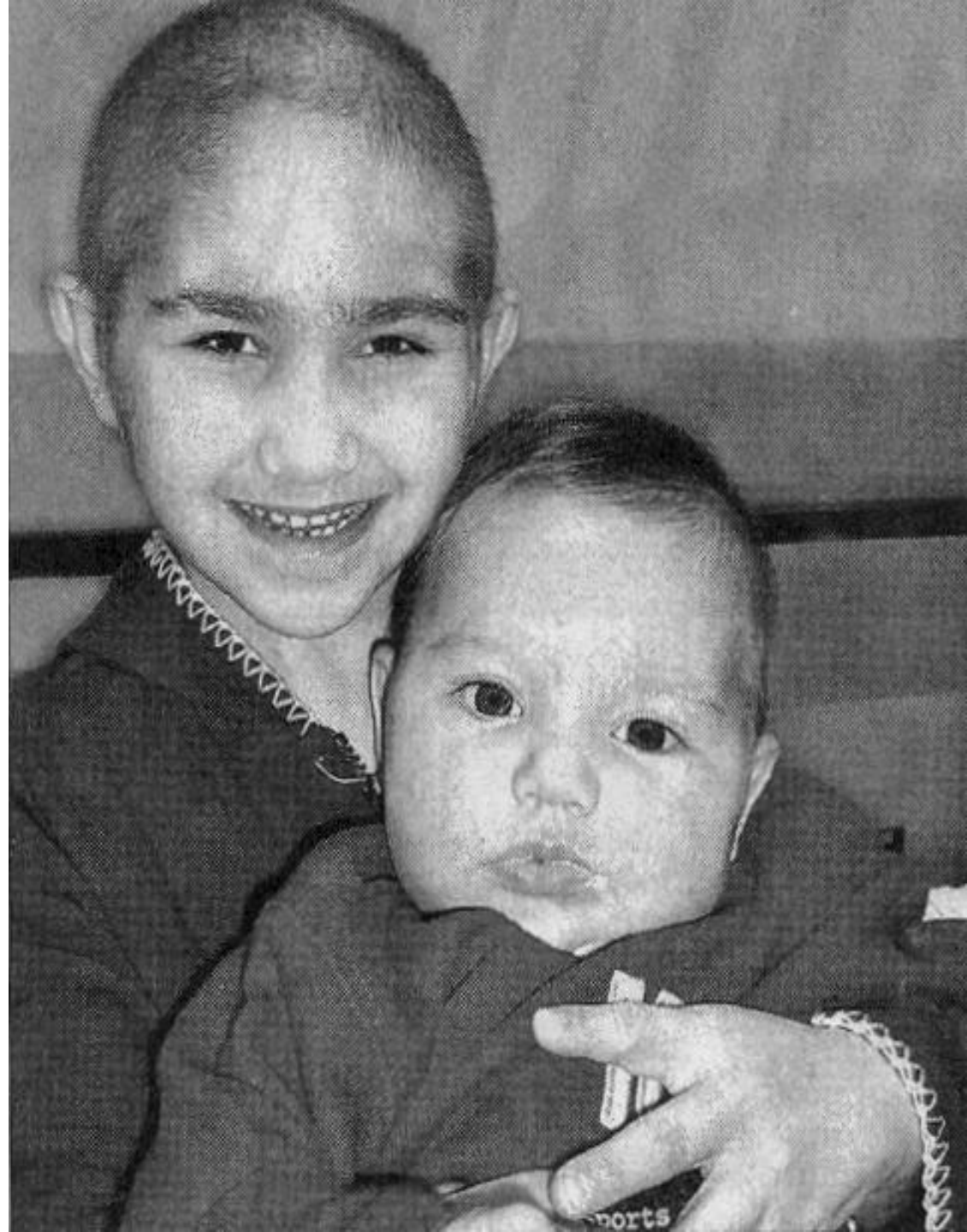
1. Type 2 diabetes
2. Coronary heart disease
3. Osteoporosis
4. High blood pressure
5. High cholesterol
6. Lung cancer
7. Colorectal cancer
8. Melanoma

This is ANDi. He is a rhesus monkey that has been genetically altered. They genetically altered him using a non infectious virus. What makes ANDi so important is that he may provide for control of Diabetes, certain Cancers and Alzheimer's



Adam Nash 1 of 15 fertilized embryos. He was implanted because his stem cells could help his sister Molly recover.

His stem cells from the umbilical cord were injected into Molly using the non infectious virus. To date Molly is in good health.



# Theological Reflection



1. Christian Worldview -
  - Creation - Perfection
  - Fall - Judgment
  - Redemption - Grace
  - Consummation - Restoration
2. The Sovereignty of God - Deut. 6:4; Psalm 115:1-3; Dan. 4:35; Isaiah 45:5-9

# Purpose of Genetic Anomalies



1. For the Sake of the Glory of God...
2. To Show Man's Brokenness and Need of Grace...
3. To Present the Church with the Gift of Unconditional Service...
4. To Increase our Desire for the Consummation...

# Pursuit of Shalom “ ”



to promote life not death; health not sickness...

to suffer and counsel with those who suffer...

to care compassionately when one cannot cure...

to be a part of God's presence in the valley of the shadow of death...

# Stem Cell Research:

## Regenerative/Reparative Medicine

1. Embryonic stem cells are removed from 4-5 day old embryos, there are about 30 cells in the center of the blastocyst, their removal kills the embryo...
2. The cells are placed in a plastic culture dish that has a nutrient broth in it & undifferentiated mouse skin stem cells to which the embryonic stem cells adhere...



# Stem Cell Research

## Regenerative/Reparative Medicine

3. As the stem cells proliferate they are transferred to other dishes and in six months there are millions of stem cells...
4. If these undifferentiated cells (pluripotent) appear genetically normal they are a stem cell line, they can be frozen and shipped to other labs for culture and experimentation...



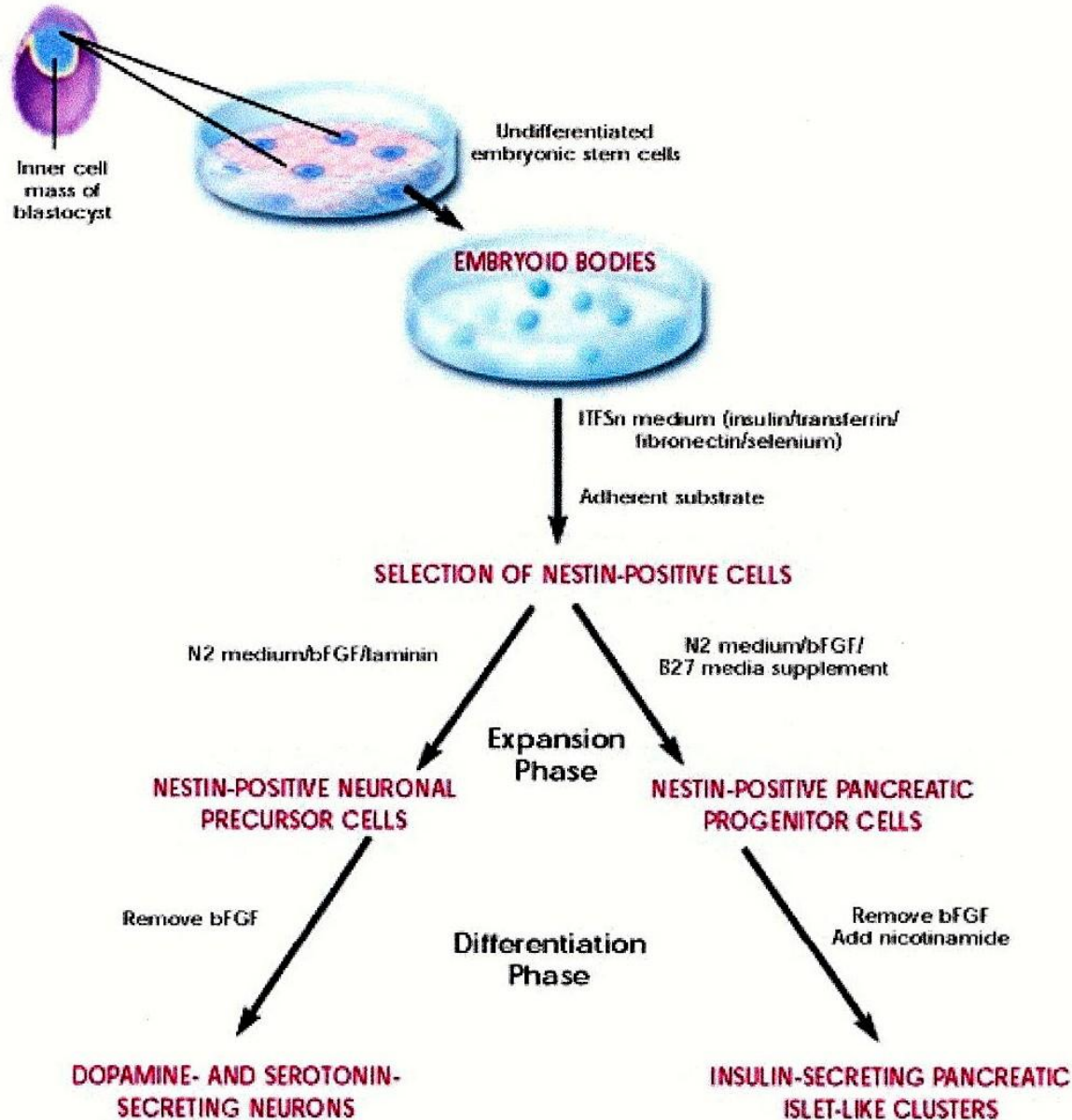
# Stem Cell Research

## Regenerative/Reparative Medicine

5. Embryonic stem cells have the prospect of developing into 220 different kinds of body cells...



# Differentiating Stem Cells



# Adult Stem Cells

1. Origin unknown – repair and maintain tissue in which they are found...
2. Bone marrow has at least two kinds of stem cells, hematopoietic & stromal...
3. At present unable to grow in a culture...



# Adult Stem Cells

## 4. Key questions remain...

How many adult stem cells exist & where are they?

Do they manifest plasticity?

Is there a single adult stem cell that can generate any organ or tissue?

What causes stem cells to relocate to injury or damage sites?



# Restatement Statement of the 6<sup>th</sup> Word

