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# BIOTEKNOLOGI DASAR

Program studi Bloteknologi

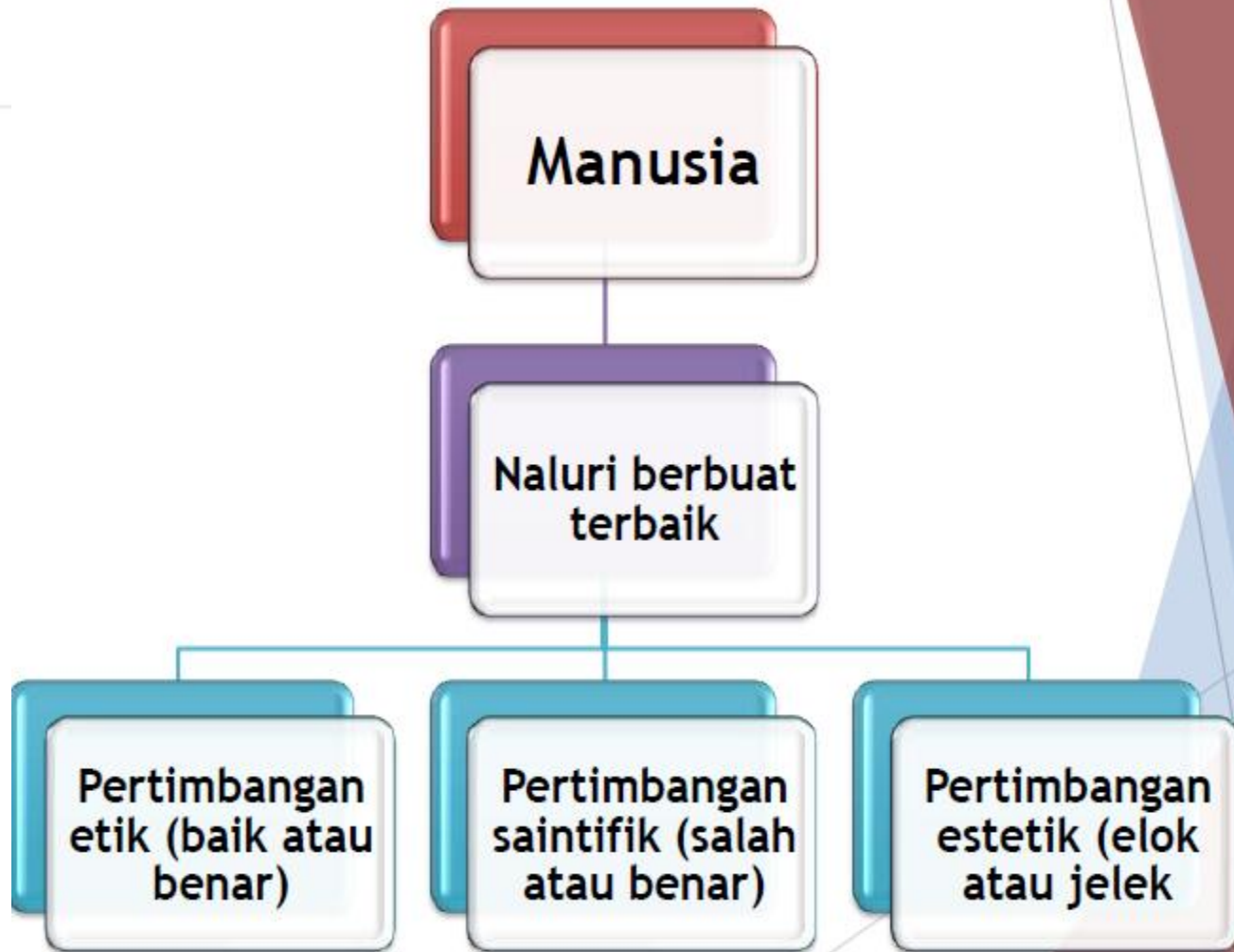
*By Seprianto S.Pi, M.Si*



**Pertemuan 8**

**Bioetika Dalam  
Bioteknologi**

# Sekilas Bioetika



# What Is Ethics?

- Ethics identifies a code of values of our actions, especially toward other humans
- In simple term, ethics could be considered as a guide to separate right and wrong, good and evil
- It considers social, moral and religious aspects but cause occasionally “**controversy**”



# Bioethics

- Bioethics is the area of ethics that deal with the implications of Biological research and Biotechnological applications
- It deals with some fundamental questions and in many aspects, it can affect the future of science, humanity, and the world where we live
- “It can emerge **dilemmas** about what we believe to make decisions”

# History of Bioethics

- Hippocrates (460 – 361 B.C.) “first Bioethicist”  
→ emphasize patient rather than the disease
- Immanuel Kant (1724 – 1804) → focuses on absolute principles
- Jeremy Bentham (1748 – 1832) and John Stuart Mill (1806 – 1873) → “Something is good if it is useful”
- Joseph Fletcher and Paul Ramsey (1970’s)  
→ Modern Bioethicist

# History of Bioethics

There are two main approach in ethical thought and methods :

## 1. **Utilitarian** approach :

- Emphasizes consequences not intentions
- Analyze various actions to determine which will have the greatest positive effect

## 2. **Deontological** approach :

- Depends on absolute (the one that cannot be broken)
- Sometimes, associated with religious tradition

## Case :

“There is situation that a person hungry and has not money to buy food, what will he / she do in appropriate manner?”

- Utilitarian = “no problem if he / she will steal for example a bread based on his / her primary needs, and there is only less disadvantage to the shop”
- Deontological = “no matter what happened, stealing is completely wrong”



## Ciri – Ciri Bioetika

- Interdisiplineritas -melibatkan ilmu pertanian, hayati, biomedis, hukum, ilmu sosial, teologi, dll.
- Internasionalisasi –problem-problem etis yang ditimbulkan dalam perkembangan ilmu-ilmu hayati bersifat internasional
- Pluralisme -banyak golongan dan pandangan diikutsertakan (Interaksi yang saling menghormati dan toleransi satu sama lain)



**Perimbangan risiko & manfaat erat kaitannya dengan prinsip umum etik penelitian kesehatan, meliputi :**

- 1) “Respect for persons” (menghormati harkat dan martabat manusia)**
- 2) “Beneficence” (berbuat baik dengan memaksimalkan manfaat dan meminimalkan risiko)**
- 3) “Justice” (keadilan bagi seluruh subjek penelitian)**

4) “Veracity” (kejujuran)

5) “Confidentiality” (kerahasiaan)

6) “Non Maleficence” (tidak merugikan, do no harm)

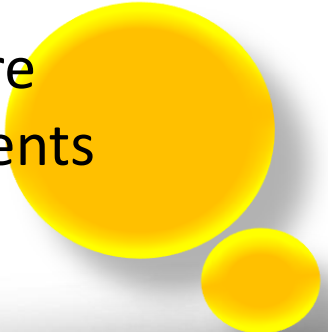
## **CONTOH KASUS PELANGGARAN ETIK PADA PENELITIAN YANG MENGIKUTSERTAKAN MANUSIA SEBAGAI SUBYEK**



**NAZI EXPERIMENTS (1943), PENELITIAN DI AUSCHWITZ “MENGGUNAKAN” MANUSIA OLEH DR. JOSEF MENGELE YANG PALING TERKENAL ADALAH EKSPERIMEN TENTANG ANAK KEMBAR (1000 PASANG)**



## CONTOH MENGELE EXPERIMENTS

- ✓ Mengele Injected Chemicals Into The Eyes Of The Children In An Attempt To Change Their Eye Color.
  - ✓ He carried out twin-to-twin transfusions, stitched twins together, castrated or sterilized twins.
  - ✓ Many twins had limbs and organs removed in macabre surgical procedures, performed without using an anesthetic.
  - ✓ Some Survivors Were Kept Alive Because They Were Twins, And He Wanted Them For Medical Experiments Aimed at creation of an **Aryan Super Race**.
- 

## CONTOH EXPERIMENTS *Kurt Heissmeyer*

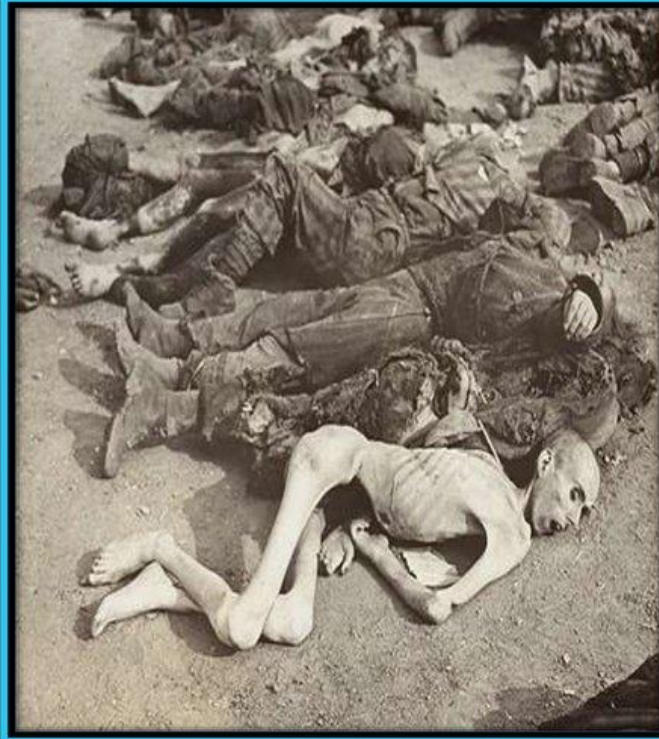
- November 1944: 20 Anak Yahudi (5-10 Tahun), 10 Pria Dan 10 Wanita Diambil Dari Auschwitz Dibawa Ke *Neuengamme, Diluar Kotahamburg.*
- Mereka dijadikan “*human guinea-pigs*” untuk berbagai macam percobaan medis oleh dokter ***kurt heissmeyer***.
- Anak Anak Disuntik Dengan Bakteri *Tbc* Hidup Kedalam Vena Dan Paru Untuk Melihat Apakah Mereka Mempunyai Imunitas Terhadap *Tbc*
- Mereka Diamati Dengan Seksama, Dilakukan Pemeriksaan, Difoto Untuk Melihat Perjalanan Penyakit.
- Kondisi anak-anak langsung memburuk dg cepat dan sakit Parah
- Tgl 20 april 1945, sebelum perang berakhir, *heissmeyer dan arnold strippel* memutuskan untuk membunuh anak-anak untuk menyembunyikan bukti kekejaman kepada tentara sekutu

## CONTOH EXPERIMENTS *Kurt Heissmeyer*

### Tuberculosis Experiments

Dr. Kurt Heissmeyer injected the tuberculosis bacteria directly into the lungs of his victims at the Neungamme concentration camp.

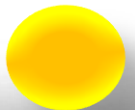
He was responsible for the deaths of at least 200 people.





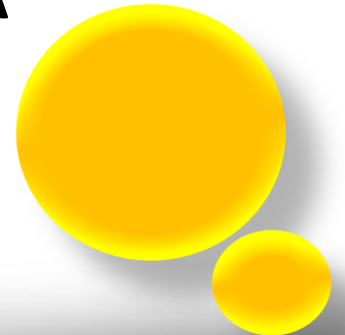
## THE TUSKEGEE SYPHILIS STUDY 1932-1972

Studi yang mempelajari perjalanan penyakit sifilis pada orang-orang negro. Para subyek orang negro tersebut, tidak diberi pengobatan, padahal penisilin telah ditemukan dan digunakan pada 1943





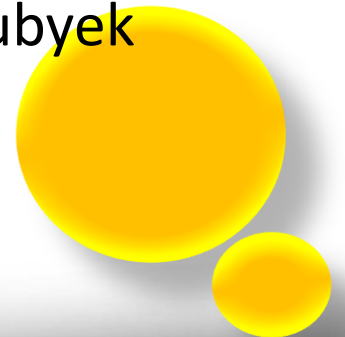
- **TIDAK SATUPUN YANG DIBERITAHU KALAU MEREKA MENDERITA SIFILIS**
- **TIDAK PERNAH SATUPUN YANG DITAWARI PENYEMBUHAN, KECUALI PENGobatan SAKIT RINGAN**
- **BAHKAN PADA SAAT PENICILIN DITEMUKAN PADA TH 1943, TIDAK DIBERI PENGobatan**
- **BAHKAN DIHALANG-HALANGI OLEH PENELITI, JANGAN SAMPAI SUBYEK MENDAPATKAN PENICILIN SUPAYA PENELITIAN BISA BERJALAN TERUS**
- **TIDAK ADA *INFORMED CONSENT***



## *Kasus Willowbrook (1950)*



Suatu studi yang mempelajari penyakit hepatitis dengan menyertakan anak-anak terbelakang. Anak terbelakang termasuk kelompok rentan yang tidak dapat memberikan persetujuan yang mendasari kesukarelaan sebagai subyek



## 1954 STUDI BAYI PREMATUR



Bayi Prematur Diberi Oksigen Kadar Tinggi Sebagai Uji Klinik Untuk Melihat Efek Pemberian Oksigen 8 Bayi Menderita RETROLENTAL FIBROPLASIA (Retinopathy Of Prematurity-rop) yang Irreversible, 6 Bayi Buta Dan 2 Bayi Kehilangan Penglihatan Pada Sebelah Matanya.



## 1963 *Study Imunitas Jewish Hospital*

### Jewish Chronic Disease Hospital Study



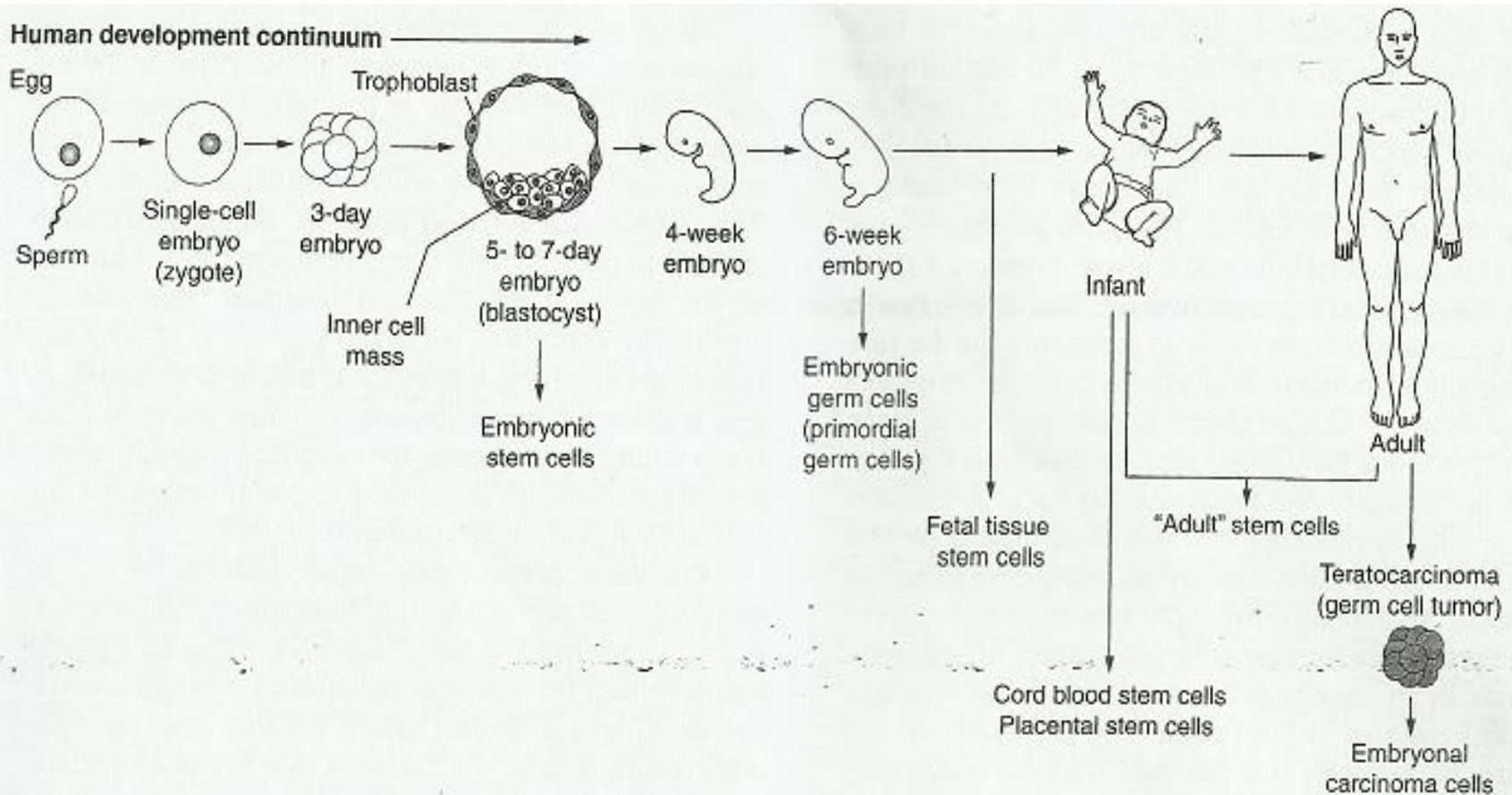
Pada th 1963 *Jewish hospital* melakukan studi yang menyertakan orang jompo sebagai subyek, dengan menyuntikkan sel kanker, untuk mempelajari reaksi imunologinya

# THALIDOMIDE: THE TRAGEDY OF BIRTH DEFECTS



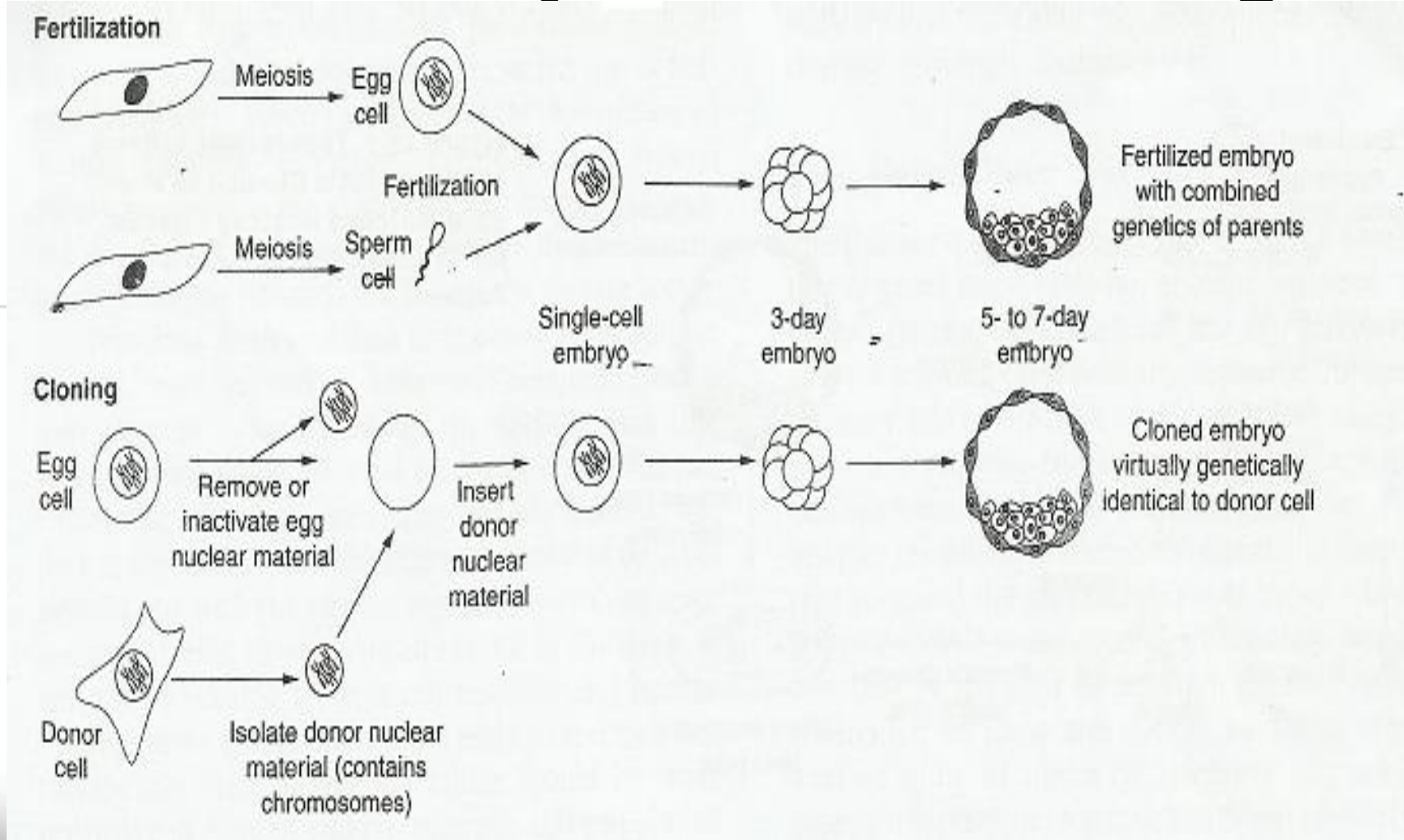
- Thalidomide was a widely used drug in the late 1950s and early 1960s for the treatment of nausea in pregnant women.
- It Became Apparent In The 1960s That Thalidomide Treatment Resulted In Severe Birth Defects In Thousands Of Children

# Controversy of Human Cloning



**Sources of Stem Cells** Using human embryos as a source of stem cells is a very controversial topic, in part because it raises the question, "When is the embryo considered to be a person?"

# Controversy of Human Cloning



# Controversy of Human Cloning

Based on pictures above, there are several dilemma questions including bioethics in human :

- “What does it mean to be a human?”
- “the status of the human embryo, is it just a simply clump of cells or is it a form of human life that deserve to be respected both moral and religious?”
- “there are smooth alterations in genetic change in human cloning, that still can’t be avoided during the process, so does the human cloning still need necessary?”



# Ethical

**Manusia + Manusia**

**Manusia + Hewan**

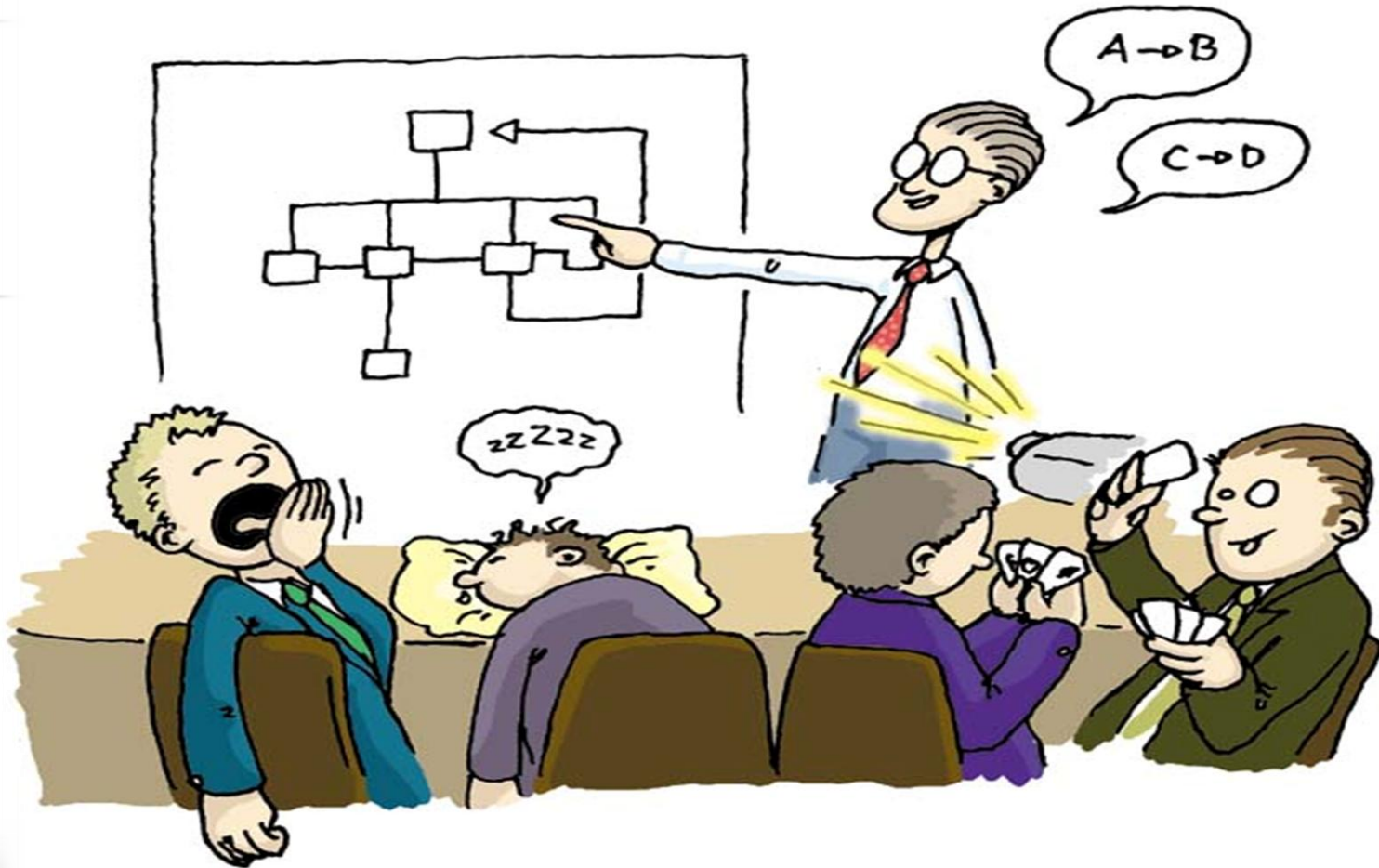
**Hewan + Hewan**



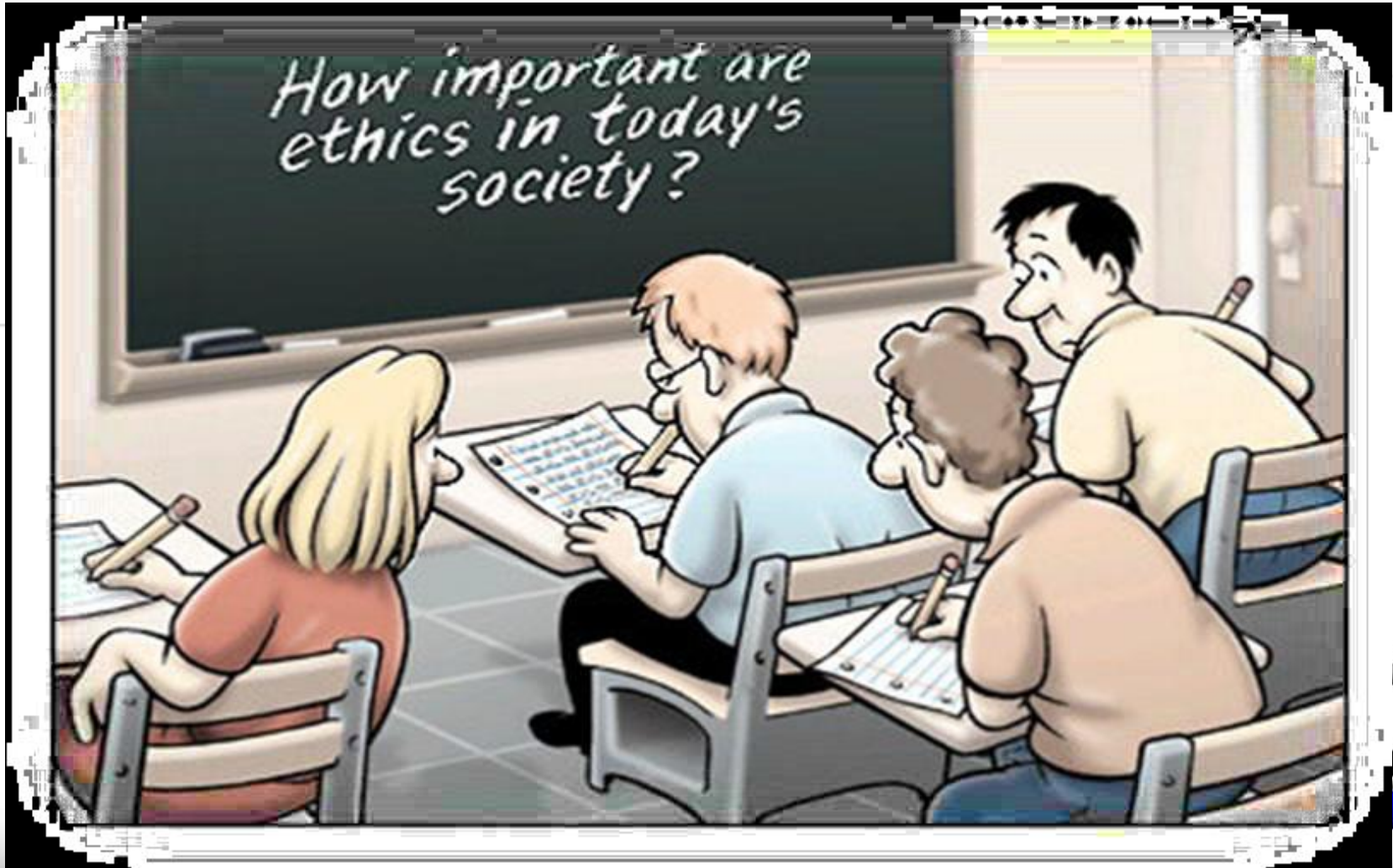
# Ethical



# Ethical



# Ethical

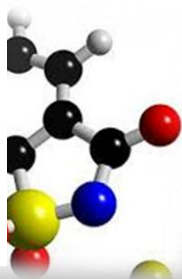


# Ethical for Animals



# Prinsip Dasar Etik Pelaksanaan Penelitian Biomedis menggunakan Hewan Percobaan

- Prinsip Etik Penelitian:
  - Respect, Beneficiary, Justice.
- Prinsip Etik Penggunaan Hewan: 3R
  - Reduction, Replacement, Refinement
- Prinsip Etik Pemeliharaan/ Perlakuan terhadap Hewan: 5F ( 5 Freedoms)
  - F from hunger & thirst
  - F from pain
  - F from distress & discomfort
  - F from injury & diseases
  - F to express normal behaviour





Group housing  
when ever possible



Enrichment devices for  
rodents: Igloo, nest etc.

Nesting materials

Human interactions

Enrichment  
Devices for NHP



## DEKLARASI HELSINKI 1964

- ❖ Disepakati oleh World Medical Association (WMA) di kota Helsinki tahun 1964 dengan nama : *Ethical Principles for Medical Research Involving human Subject.*
- ❖ Deklarasi Helsinki diakui sebagai dekomun utama fundamental dibidang etik penelitian kesehatan serta memberi pedoman kepada dokter yg melakukan penelitian kesehatan klinik dan non-klinik.



**Deklarasi Helsinki : 'Ethical Principles for  
Medical Research Involving Human Subjects'  
butir 11 dan 12 (World Medical Association)**

## Butir 11

- Penelitian kesehatan yang mengikutsertakan manusia sebagai subyek penelitian harus memenuhi prinsip ilmiah (*scientifically sound*). berdasarkan → kepustakaan ilmiah, percobaan di laboratorium; dan dilakukan percobaan pada hewan (bila diperlukan)

Ethics

IRB

Human

Subjects

Monitoring

Compliance

Justice

Beneficence

Respect

Education

Research

A word cloud featuring various expressions of gratitude in different languages and scripts. The most prominent words are 'THANK YOU' in large, bold, black capital letters. Other visible words include 'GRACIAS', 'ARIGATO', 'SHUKURIA', 'DANKSCHEEN', 'TASHAKKUR ATU', 'SUKSAMA', 'BIYAN', 'SHUKRIA', 'GRAZIE', 'MEHRBANI', 'PALMES', 'BOLZİN', 'MERCİ', 'JUSPAXAR', 'GODHARSHITA', 'SPHARSHITA', 'KOSAPUSPANA', 'HAARET', 'YAGHANYELBY', and 'TINGGI'.