



Cyborgs

Cybernetic organisms

Expanding the horizon of
the human potential

Cyborgs or

Homo Evolutis

n. ho-mo ev-o-loo-tis

Hominids that take direct and deliberate control over the evolution of their species... and others.

Going from this →



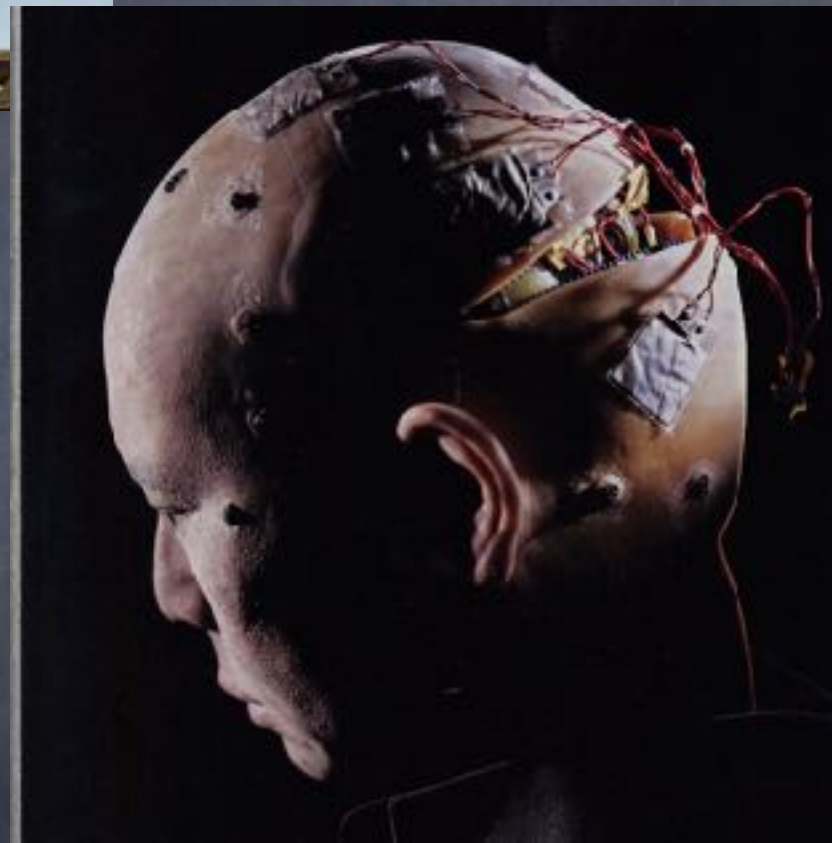
www.simpsonstrivia.com.ar/wallpapers/homer-simpson-wallpaper-brain.htm



Flickr: futurestreet

← to this!





and the Hollywood
beauty version →

or better yet . . .



Alicia Vikander



Improving Human v.1.0

- Limited conditions of Human v. 1.0 include
 - physical capacity
 - cognitive capacity
 - Life span (Later BIF subject)

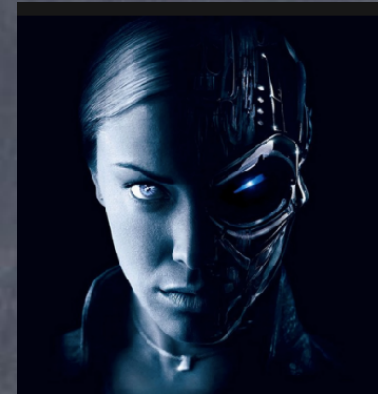
Starting Point on the way to Humans v. 2.0

With today's technology, we can

- replace skin, hair, eyelashes, joints (shoulders, elbows, wrists, jaws, hips, knees, toes, fingers), teeth, lips, arteries, hearts/ heart valves, limbs and bones, breasts, entire organs -
- WE CAN EVEN CHANGE OUR SEX

Starting Point on the way to Humans v. 2.0

- **Most recently** . . . besides the artificial limbs, pacemakers and exoskeletons
 - artificial retina
 - cochlear implants
 - satnavs (sub-dermal compass)
 - brain pace makers (30,000 patients) to alleviate symptoms of Alzheimers



5 Steps to Human v.2.0

What do we have left?

Not much:

- 1. Artificial voice (already on its way)
- 2. Skeleton
- 3. Digestive tract
- 4. Blood
- 5. Brain

5 Steps to Human v.2.0

2. A new skeleton

- Our skeleton is a stable structure but it ages and 'crumbles'
- we can gradually introduce, non-invasively, **nanotubes of superior strength** and weight, and slowly replace the calcium-based structure. Human Version 2.0 will be very strong, non-aging, AND **self-repairing**



5 Steps to Human v.2.0

3. A new way of eating/digesting

- Just like sex, where we have separated pleasure from its biological function (reproduction), we can separate the pleasure of eating from its biological function (providing everything our body needs)

- How?

5 Steps to Human v.2.0

3. cont'd

Short term approach:

▣ Nanobots in the intestines and in the blood will intelligently **measure**

- exactly what our body needs and nothing more,
- order additional nutrients/supplements as needed, and
- eliminate the rest

5 Steps to Human v.2.0

3. cont'd

Long term approach

- All nutrients and supplements will be introduced into the bloodstream by nanobots (sensors in the blood and wireless communication to external) and



5 Steps to Human v.2.0

3. cont'd

Long term approach

□ We will be able to eat anything we wish while optimizing the flow of **nutrient in the bloodstream** - nanobots will take over the elimination function - eventually making the **digestive tract superfluous**



5 Steps to Human v.2.0

4. New blood

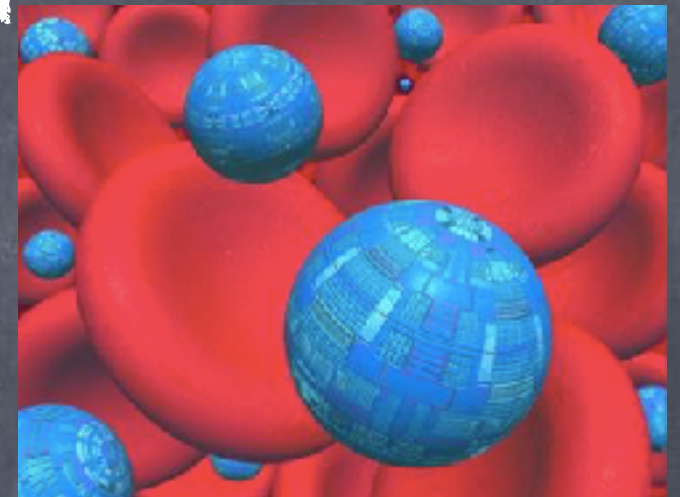
Short term:

▣ **Programmable blood** - red blood cells are inefficient; synthetic blood cells - **Respirocytes** - with 320 x **O₂ uptake** will enable us to go for hours without oxygen (impact on athletics, divers, climbers, general life)

Billions of nanobots will circulate in our bloodstream will

- ▣ correct DNA
- ▣ destroy pathogens
- ▣ eliminate flaws/errors, eliminating toxins

Cont'd



5 Steps to Human v.2.0

3. cont'd

Long term:

- Potentially, 100,000 times more
- efficient* (and with the ability to eliminate CO₂),
respirocytes** will eventually make lungs superfluous

□* With existing blood, we breathe 5-6 million times per year (10-12 breaths/min)

□** With respirocytes we can breathe 10-60 times per year

cont'd



5 Steps to Human v.2.0

3. cont'd

- . . . and with a **vasculoid** - a non- or semi-fluid medium (artificial blood cells), blood can be completely replaced

5 Steps to Human v.2.0

4. To Have Or Not to Have - A Heart

□ We can replace it today . . . But can we do without it?

Short term:

□ Artificial hearts (already in progress)

Long term:

□ A nanorobotic **vasculoid** with its **OWN mobility**, we can eliminate the need for pumping - and make the **heart superfluous**

5 Steps to Human v.2.0

5. The ultimate prize: A non-biological brain

Short term:

- We already have implants for various regions of the brain; f.x.:
- MIT/Harvard: replacing the damaged retina-area with neuromorphics implants
- Long term: by "treating the circuitry" rather than adding chemicals to suppress neurotransmitters, we can have centers with implants that reverse effects of Parkinson, cerebral palsy, multiple sclerosis

5 Steps to Human v.2.0

5. cont'd

Long term

- Ultimately, we will place **sensors** in the brain that will be programmed to recognize brain patterns associated with certain activities and then stimulate the appropriate sequence of actions
- The result is . . .

5 Steps to Human v.2.0

5. cont'd

Long term:

- E.g. :they can make paralyzed people walk again
- . . . and if the muscles don't work, we'll use nano-electro-mechanical systems (NEMS) that expand and contract the way muscles operate (designs already underway) based on real or synthetic nerves

5 Steps to Human v.2.0

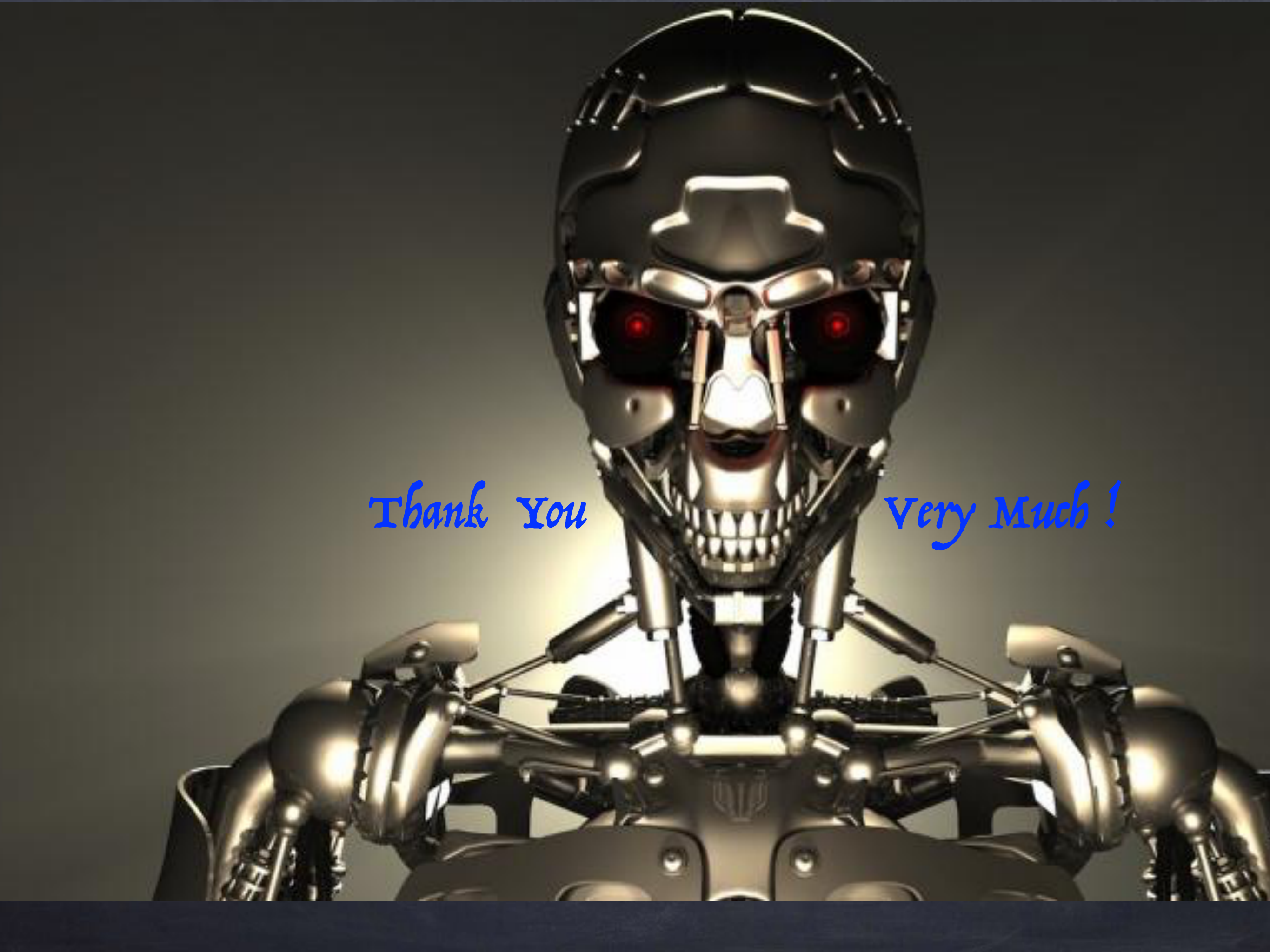
- SUMMARY:
- By 2025/2030, Human v. 2.0 will be more non-biological than biological
- There will be many versions of Human v.2.0
- Technology for various organs and body parts will develop at different pace
- according to elimination of constraints

HUMANS v.3.0

• Big Qs:

HUMANS v. 2.0

- Is H v.2.0 something we want?
- If not, can we avoid it?
- Who will decide on that?
- Will only the rich have access to H v 2
– or H v. 3?
- What will it all do to society?



Thank You

Very Much !