STUART M. DAMBROT: *HOMO SYNTHETICUS*

November 04, 2003

Homo Syntheticus: The world beyond GNR

In the **Fall/Winter 2003 Issue of CIO Magazine**, MIT's Negroponte writes extensively about his doomsdayish vision of future developments in GNR - genetics, nanotechnology and robotics. What surprised me is what he doesn't mention - in fact, what I've yet to find explicitly published anywhere.

Homo Syntheticus. The *ultimate* GNR convergence. The species destined to supplant Homo Sapiens.

A species in which synthetic genes that express as synthetic cells, tissues and organs with specific, predetermined technological functions. Genes that can, if desired by the individual, be coded to be passed along to future generations.

The basic components are here, and most certainly will grow in number, diversity, complexity and integration, marked by accelerating increases in the:

1. specificity with which DNA, RNA and protein analysis can map structure to expression;
2. precision, decreasing size and growing functional range of carbon, molecular and atomic nanostructures;
3. autonomy of artificial intelligence (in its broadest sense) and artificial life; and
4. sophistication of high-level languages for designing and constructing intelligent nanostructures.

Nothing new so far...but discussions have still been confined to genetic therapies, sensors, biocomputing, and other obvious topics. What's missing is the leap to what might be called *synthetic biology*.

I see these leading to our ability to specify, design and code - through a genetic sequence design language, or GSDL - synthetic DNA and RNA (sDNA and sRNA, respectively) that autonomously expresses as synthetic proteins, cells, tissues and organs with not just bioartificial properties, but technological functionality as well. **Synthetic, self-assembling computational, communications, memory, sensorium, and other biodevices expressed from sDNA and sRNA - all *in vivo*, and able to be passed on to offspring if desired by the individual.** No more devices. No more implants. Just the bravest new world imaginable.

November 13, 2003

Homo Syntheticus, Phase I: synthetic genomes arrive

...sooner than I expected.

Today smokestacks, tomorrow bronchi: Progress in creating artificial virus.

November 14, 2003

Home Syntheticus, Phase II: make way for the quasiparticle!

Thanks to Roland Piquepaille's Technology Trends blog for finding Pitt research delves into amazing shrinking computer chips.

Next step (an admittedly big one): nanoscale genetic assemblers generating custom genomes that express as fermionic biodevices with controllable quantum properties - like entanglement.

Meaning...a cluster of synthetic neurons designed to translate between languages (yeah, I know, like *Farscape*), engage in quantum communications (i.e., no time lag regardless of distance), or place autonomic regulation under voluntary control (without studying in Tibet for 20 years).

November 19, 2003

Homo Syntheticus, Addendum A: artificial pores

You see where I'm going with this...genetic sequences that express as skin cells with toxic substance-detection capability. It starts here: ScienCentral: Super Screener.

November 21, 2003

Homo Syntheticus, Addendum B: DNA/nanotube transistors

The paragraph that really struck me:

The scientists then coated the DNA with gold, producing a simple electronic device consisting of the nanotube connected to gold wires at each end. Current through the nanotube could be switched on or off by applying an electric field — the definition of a transistor.

Smaller Computer Chips Built Using DNA as Template

November 27, 2003

Homo Syntheticus: blueprints

The Federation of American Scientists' *Digital Human* project is laying the groundwork for designing artificial organs of all types - check out this excerpt:

Artificial Organs and Prosthetics

Computer models are already being used to design artificial hips, hearing aids, prosthetics and other devices fitted precisely to the requirements of individual patients. The Digital Human will provide a reference model that would increase the accuracy and validity of these designs, as well as speeding the development of a much wider variety of devices. By combining a vast amount of measured information into a single model, the Digital Human simulations would provide a powerful tool for learning how to mimic the operation of human organs – whether the heart, or kidneys, or the ear. They would also help ensure an accurate interface between artificial organs and the environment in which they will function (including their performance under extreme conditions that would be otherwise difficult to test).

Read the project summary:
http://www.fas.org/dh/publications/consortium3.doc

December 02, 2003

Homo Syntheticus: synthetic DNA from synthetic oligonucleotides

Not just a sci-fi fantasy...

Summary:
Smith et al., 10.1073/pnas.2237126100

Press Release:
Institute for Biological Energy Alternatives
