



## **The Body Builders: Inside the Science of the Engineered Human**

*Adam Piore*

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By uniting machine and human, hacking our genetic codes, and understanding the body's molecular structure through engineering principles, cutting-edge scientists are pushing us beyond our natural limitations. And it's not really about gold-medal Olympics performances. From regrowing damaged legs to using telepathy to assist those who can no longer speak, these new techniques are helping ordinary individuals everywhere build better bodies and better lives.

## **The Body Builders: Inside the Science of the Engineered Human Details**

Date : Published March 14th 2017 by Ecco

ISBN : 9780062347145

Author : Adam Piore

Format : Hardcover 384 pages

Genre : Science, Nonfiction, Health, Medicine, Futurism, Popular Science



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Adam Piore**

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## **From Reader Review The Body Builders: Inside the Science of the Engineered Human for online ebook**

### **Courts says**

Only read up to Chapter 7. Couldn't make myself finish the rest of it. The first couple of chapters weren't bad but I think it is full of unnecessary details. I'm a Human Kinetics graduate and even I didn't want to read that amount of detail. I was hoping for more on the philosophical questions that bio-engineering poses.

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### **Ollie says**

One of the greatest things science can offer us is the ability to better ourselves: improve where possible, correct mistakes, fix what might be broken. That work is certainly going on right now and Adam Piore's Body Builders presents itself as a look behind all the science that goes behind engineered humans. It's right there in the title. The problem is that that isn't really the case, or maybe we have different definitions of what an engineered human is. Engineering to me means something like genetic tampering to cause a desired phenotype. That's not what this book is about. If you're thinking in the scope of the 6 million dollar man, then you have a better idea of the subjects we encounter in this book. I like to think of these more as humans with gadgets.

Although Piore makes a valiant effort to tell his story, unfortunately Body Builders suffers from some major pitfalls that are much too frequent in popular science writings. For starters Piore seems to focus too much on the boring experimental details involved in the science yet still not painting a clear enough picture of what's going on. Look, these experiments are just boring, and we don't need to know where every single wire is placed. Some charts or drawings would have helped us understand what's going on. Other times, Piore presents the results in a confusing manner. For example, when he tells the story of how recording the neuron activity in patients listening to Pink Floyd can lead to scientists pulling Another Brick in the Wall out of the data, I think what he means that the brain patterns can be interpreted into melodies that can be played back like something akin to a midi track. Cool stuff, for sure, but Piore makes it sound like we can hear a segment of the actual song.

Then there's the fact that Piore just isn't a very exciting storyteller. While someone like Oliver Sacks manages to tell compelling stories behind his subjects and focuses on the important details, numerous times the reader will simply get frustrated as Body Builders keeps telling the story of the scientist, the collaborators, and the science that preceded it and so on instead of just focusing on what they're trying to do in the present moment.

Body Builders has a lot of potential but ultimately just ends up being a fragmented and unfocused read. Although there is some cool science discussed it happens too seldom to make this a real page-turner.

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### **Ruth says**

Fascinating & well-written, this book is a composite of some of the research & applications currently in Biomedical Engineering. It does not require any previous knowledge in the area to understand & appreciate.

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## **Andrei Khrapavitski says**

Do you like your body? You'd better. That's the only one you have. But if you think of it, it is full of imperfections. Many of us like watching superhero movies maybe because we fancy some incredible abilities our bodies can't give us. In addition to being imperfect, our bodies age. We get sick. We die. That's the story of each and every one of us.

The only way we can, at least, attempt to do something about it is through accelerating research into the fields of science which would allow us to be healthier and live longer. What if through invention and deployment of novel technologies, we could control biological processes within the body in order to repair or even eradicate them? What if there no such thing as human disability?

Adam Piore, a contributing editor at Popular Science and Discover Magazines, has written a fascinating book about the quest to enhance human bodies. He split the book into three parts. The first one is about scientific breakthroughs in replicating the way we move: bionic arms and legs, decoding the genome and rewriting it, regenerative medicine and attempts to regrow limbs; the second is about sensing: understanding the neuroplasticity of the brain (for instance, a case of a woman who can see with her ears), attempts to come up with learning pills, soldiers with spidey sense, intuition and implicit learning, decoding the brain and imagined speech; finally the third part is about thinking: why some people remember much more than others, attempts to improve memory, deep brain stimulations as a way to treat some severe conditions like depression, etc., and also a chapter about savants and scientific quests to understand and enhance creativity.

This book will acquaint you with patients whose conditions and their treatment led to some great insights and scientific breakthroughs. It is also a book about scientists who are leading some cutting edge research, like Edam Eskander's exploration in deep brain stimulation and Hugh Herr's bionics, Gerwin Schalk's research into brain-computer interfaces, etc.

Adam Piore doesn't offer a Kurzweilian promise, although this is a pretty optimistic book. At the end of each chapter and in the conclusion, he poses some ethical questions as to what consequences these technologies might have on our society, especially if misused. However, I fully agree with him when he writes: "To me, fears of government mind reading seemed distant indeed next to the story of David Jayne, paralyzed and no longer able to speak, using technology to clown around with his two little children at dinnertime, and tell them he loves them. Or of a blind Pat Fletcher standing in the desert weeping because she could "see" the mountains again—by using her ears. For me, concerns about the remote possibility of a terminator created in some distant future quickly faded when juxtaposed against images of Hugh Herr out for a brisk jog around Walden Pond on prosthetic runner's legs."

Indeed, these new technologies are already giving hope to millions of people suffering from various illnesses which just a decade ago seemed incurable. Piore beautifully sums up: "These new technologies need not be contemplated with dread, or seen simply as tools to transform or transcend humanity. Any efforts to augment our abilities for our immediate future are not the main point. The most important story is the one about enhancing not our abilities, but our humanity—our ability to do that which in the final analysis makes life meaningful and worth living."

Highly recommended for all curious readers interested in neuroscience, bionics and transhumanism.

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### **Zech Tan says**

Fascinating facts from the book:

Extra Cellular Matrices (ECM) e.g. from pig bladders contain "cryptic peptides" that attract stem cells to an injured area = potential to regenerate limbs

Neurons connected by synapses "talk" by passing electrochemical signals; Hebbian learning = synapses that fire together wire together

'Efference copy' = an internal impression the brain creates about what an action feels like so it can check the resulting output and make corrections if necessary

Acquired savant syndrome = brain trauma that results in superhuman new abilities

Possible to unlock creativity by suppressing frontal lobe

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### **Christina Dudley says**

Vastly interesting book about different aspects of fiddling with the human body: prostheses, gene manipulation, regrowing tissues, "mind-reading" with computers, and so on. Some of the topics repeated other books I'd read, especially if they were brain-related. (Patient H.M. put in a typical appearance, for example.) The great fun of reading nonfiction is the hope it gives you in learning about treatments for all our ailments and injuries.

One note for the editor, or whoever can still fix the ebook edition: for Pete's sake, correct all the "basal ganglia" references that are misspelled "basil" ganglia! It's like everyone was fixated on pesto when they wrote/edited those passages.

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### **Sara says**

I found this book soooooo painful to read and I love this topic!

I just didn't love the author's writing style, organization, and explanations.

Some of the content is quite interesting like how to see without sight or sudden genius. But much insight could have been gleaned by an image of any kind at all. Some chapters got super repetitive and dull as well.

To be honest I only finished this to meet my challenge. ?????

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### **Alejandro Teruel says**

The title only covers the first third of the book, the rest would be more aptly titled *The Mind Changers*. It provides tantalizing glimpses into ongoing studies on prosthetics, regenerative medicine, gene therapy, neuroplasticity, implicit learning, deep brain stimulation, brain-computer interfaces, biochemical memory enhancement, and how the brain enhances or inhibits creativity. The author set himself an impossibly

ambitious project and winds up with a fragmented and confusing jumble of bits and pieces. The book would have been better if it were better focused and edited. After all there is nothing wrong with what I consider was the starting point for the book:

...I found myself focusing on what to me seemed the more powerful ideas and uses for these technologies, and the stories that stayed with me. They all related to what drew me to bioengineering in the first place -that ability to restore to those who have lost them, the things that allow us to express our humanity and connect with the world and those around us.

I found Norman Doidge's probably somewhat dated *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science* (2007) on neuroplasticity much better integrated and if you are at all interested in the mysteries of neuropsychiatry, Oliver Sacks is a far more interesting and better writer.

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### **Jason Leow says**

This book is hard going, not because the science is dense (it is for novices) but because there is so much over-reporting, sometimes within single sentences. Often the protagonist's narrative in each chapter is overlayed with the stories of other multiple characters involved in the scientific breakthroughs. I wish the author had just focused on the protagonist and had narrated the science straight. This book demonstrates story-telling on overdrive and is exhausting to read!

Eg. "Engineers across the Charles River at Draper Laboratory are working closely with Dougherty and Eskander to develop the needed hardware."

"A thick jumble of mesh-covered wires protrudes from the opening at the top of the skull, as if she were related to Jabba the Hutt's sand-colored majordomo, the tail-headed Bib Fortuna."

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### **David McElroy says**

This book did a great job of balancing a number of typically opposing forces—human narratives and hard science, hopes and fears for the future, excitement about technology improving us yet concerns about losing our humanity in the process. At its heart, it's a book about optimism and hopes for the future, but it's very much grounded in the present-day state of technology and scientific research. It's detailed enough to be informative but written engagingly and compellingly. Strongly recommended to anyone interested in the cutting edge of medical research, transhumanism, or the relationship between people and technology. I will warn you, though—the descriptions of the diseases these doctors are trying to treat can be pretty grim. Thankfully, we're closer than ever to curing them, thanks to the valiant efforts of the people described in this book and others.

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### **Steve Nolan says**

Book progressively got worse, but only really b/c I'm way more interested in biomechanics than I am brain-stuff. It's written pretty well for a general audience though! Maybe gets into experimental minutia a bit much, but adds some cool stories. Would have prolly given it 3 stars if I didn't like, have a bioengineering

degree already. (Is a degree-drop a thing? Like a name-drop, but with more studying?)

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### **Katie says**

I heard this author on NPR and thought that his book sounded interesting enough to grab it off the shelf in the library. I'm really glad I did because I loved it! The author goes through a variety of ways that people have tried to augment and re-engineer the human body. My undergrad was in Bio Engineering and some of the topics that were covered brought me back to some of those classes from long ago. He discussed ways prosthetics are being re-engineered, attempts to tinker with our genomes, attempts to regenerate limbs and tissue, re-wiring our brains and learning, and inspiring creative thoughts. He goes into a fair amount of detail about the scientists doing the cutting edge work, their motivations, their experiments and some of the context, history and assumptions they are working with. I really liked the science in the book and learned a lot! I am hanging on to the book as long as the library will allow because I need to review it, there were a lot of details I've already forgotten!

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### **Joshua says**

This book was amazing. From start to finish I was left spellbound by the possibilities of technology that, is no longer the stuff of science fiction, but a steadily growing reality. Stories about a blind woman "seeing" again to a man becoming a musical prodigy after suffering a severe concussion, and a man essentially regrowing limbs offer up a profound sense of possibility for the future. Scientists and engineers are most likely the target audience of this book, but I hope that lovers of literature and future writers take the time to read Piore's work because it provides a glimpse into the future of what human civilization can and will be.

Technology forever alters the reality of those that participate and use it in their daily lives, and each time a new innovation reaches the markets or industries human changes significantly. Whether it was the industrial revolution or even the simple art of sharpening stones, humans beings rely on technology. Our creativity and being is intimately connected to innovation. Our reality is steadily going to change, and so a book like The Body Builders is a chance to reflect on what is possible, what is coming, and then ask the ultimate question, what will it mean to be a human being?

These questions are important, and I'll allow the reader to come to their own conclusion. But Piore provides at least one of the most clear answers in that being human is overcoming obstacles through persistence, innovation, and sheer force of will.

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### **K. Counihan says**

#### **Science Fiction becomes Reality**

A very well researched book that was written for the general public. A disabled person my self, there are not enough people like Peter Meijer in this world. Thank You sir for taking the time to come to this country to help Pat Fletcher.

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**Joe Loncarich says**

Since I am a stupid person. I glanced at the cover, saw Body Builders, and thought this would be a Meathead's delight filled with hilarious anecdotes about the world of professional bodybuilding. This is not that book, but it's still super good. I don't stay up on advances in science all that well, and this book really opened my eyes to how far we have come scientifically. There have been incredible breakthroughs in what doctors can now do for ailments, and it's pretty damn exciting to see where things go in the future.

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