

GADGET GUIDE: BIOTECH

Medical science has long sought ways to cure, heal, and improve the human condition, but the knowledge to heal also comes with the knowledge to harm, and the science of improving life can also twist it in a variety of ways.

Biotech looks at biological technology, from cloning and genetic engineering to biometrics, forensics, biomodification, biological equipment, and biochemicals.

DESCRIPTORS

Biotechnology is technology based on or affecting life, life forms, or life processes. The term is also commonly used for living creatures (or the products of them) turned into technology (see the **Living Technology** section of this Guide).

DNA, short for deoxyribonucleic acid, is the molecular encoding of the genetic instructions for the development and growth of organisms (or, at least, organisms on Earth for settings with alien life). Understanding and manipulation of DNA is often essential in more advanced biotech.

Genes are molecular units of hereditary traits, encoded into the DNA, and the foundation of *genetics* (the study of genes). When a genetic descriptor is applied to a trait, it generally means that trait can potentially be passed on to the subject's offspring and is inherent in the subject's DNA, meaning it will carry over to a clone of the subject, for example.

In some cases there may be a distinction between the genetic *potential* of the trait and its *expression*. For example, certain humans in an M&M setting might have the genetic potential to develop superpowers, but that potential expresses in different ways depending on how it is triggered. Therefore, offspring only inherit their parents' potential, not necessarily the same expression.

MODIFIERS

The following effect modifiers suit some biotech powers, gadgets, and techniques:

Injected: The effect must be injected into the target's body in order to work. This means it must first penetrate the target's skin or outer surface, typically using a needle or other injector. This is essentially the same as the Resistible flaw from the *Hero's Handbook*, adding a Toughness resistance check on top of the effect's existing resistance. If the Toughness check succeeds, there's no injection and, therefore, no other effect. *-1 point per rank.*



Slow: An Affliction or Weaken effect with this flaw takes much more time to affect its target, usually outside of the rounds of action time. A Slow effect may take minutes, hours, or a day or more between checks to resist and overcome it. On the upside, the effect lasts longer, but it may not take effect quickly enough to change the outcome of the encounter where it is used! This makes an Affliction or Weaken effect operate more like a traditional toxin or disease. *-1 point per rank.*

BIOMETRICS

Biometrics are a wide range of techniques for identifying individuals by their physical traits, including but not limited to finger- and palm prints, blood type, DNA, facial recognition, iris- and retinal-patterns, and even less tangible qualities like gait, gestures, and voice.

Biometric techniques require at least an acute sense (see the **Senses** effect in **Chapter 6** of the *Hero's Handbook*) and many need an analytical one; other senses are not sufficiently refined to provide useful data. Most of the time, this data is gathered by sensors more acute than normal human ones, but some characters with acute or analytical senses may be able to gather and use biometric data on their own. For example, a character with acute olfactory senses could tell different blood types by scent alone.

Likewise, certain effects can mask or change biometric information. Broadly speaking, any effect that conceals or changes a character's appearance can fool things like facial recognition (perhaps with an opposed Perception versus Deception or power check). For finer biometric data, a Precise effect is generally required; so Precise Morph, for example, allows characters to not only disguise their appearance but to put forth false biometric data like blood composition, DNA, retinal patterns, and so forth, fooling various acute or analytical sensors.

FORENSICS

One area where biometric data is applied is forensics, gathering and processing evidence in the investigation of crimes (or other scientific pursuits). This is covered by the Investigation skill in **Chapter 4** of the *Hero's Handbook*. Checks to gather and analyze evidence often involve biometric data. Characters with acute or analytical senses may be able to forego circumstance penalties for not having tools (not needing them to get useful information) while some Precise power effects—notably Morph—may

confuse forensic evidence, leaving misleading traces that implicate the wrong person, for example!

SECURITY & SURVEILLANCE

Biometrics are also used to identify particular people for security and surveillance purposes, such as finger- or palm print scanners, or retinal scans built into locks, or retinal scanners and facial recognition software used in surveillance cameras. This can help to secure sites against intrusion, or become a tool of a police state. Indeed, things like modern facial recognition may be why superheroes and villains wear masks!

As with forensics, certain effects may provide concealment from biometric scanners while some Precise effects may be able to fool them with false information.

GENE SEQUENCING

The ability to study and sequence DNA can tell a great deal about a subject. In addition to potentially identifying someone from a DNA sample (even a stray hair, a few flakes of skin, or a drop of blood), if a subject has genetic modifications or powers with a genetic or mutant descriptor, they will show up as part of the test, which may even be able to identify what powers the subject has! The same is true for non-human characters; even if an alien is completely human-looking, a DNA test will show otherwise.

BIOCHEMICALS

There is a fine line between “medicine” and “poison”—often just a matter of dosage. That line gets even blurrier when dealing with “designer drugs” and engineered biochemicals with a variety of purposes.

TREATMENT TOOLS

The most common role biochemicals play is as a part of the tools used with the Treatment skill for dealing with injuries and illnesses. This generalizes the pain-killers, antibiotics, stimulants, and other drugs commonly found in a well-stocked first-aid kit or doctor’s bag. Inventors with an Expertise in Biochemistry might be able to use these basic ingredients to whip up inventions at the GM’s discretion.

COMPLICATIONS

Medications can also serve as mitigators, or even triggers, for certain complications. A diabetic—or a character with another chronic condition—might need regular doses of medication to stay healthy and avoid complications, but then the need for a supply of medication can itself become a complication. Likewise, an addiction (physical, psychological, or both) to a drug is also a potential complication, whether the drug is purely recreational or has some other effects.

WONDER DRUGS

Comic books are full of “miracle pills” and “super-serums” with amazing effects, especially in the Golden and Silver Ages before the “war on drugs.” Some of these wonder drugs are sources for empowerment (see the **Genetic Engineering** section, following) providing a biochemical descriptor for the character’s powers. Others have strictly temporary effects with the Fades or Unreliable modifiers (and Activation, if the character must take a dose to activate certain powers).

TAILORED TOXINS

Other biochemicals are baneful brews, usually cooked up by villains and functioning as a poison of one kind or another. These are typically Affliction effects, resisted and overcome by Fortitude, since they work on living biologies, and causing a wide range of conditions. The **Hazards** section of **Chapter 8** of the *Hero’s Handbook* provides some sample poison ranks and effects for comparison, and many real and fictional toxins have the Slow modifier from this Guide, taking effect over minutes or hours rather than in the seconds of a single action round.

MICROORGANISMS

Microorganisms or microbes are the vast variety of microscopic life forms, including bacteria, protozoa, microscopic plant-life, and often viruses (although some classify the latter as non-living). The key quality of microorganisms is their size, which allows them to infiltrate and often affect the biological systems of other life forms, causing disease and allergic reactions, for example.

DISEASE

Most diseases in superhero settings are either handled as extended complications (much like **Lasting Injuries** in **Chapter 8** of the *Hero’s Handbook*) or as specific powers, inflicting fast-acting disease symptoms on targets as an Affliction, for example. The **Hazards** section of **Chapter 8** of the *Hero’s Handbook* also talks about game mechanics for diseases and their effects and provides some sample disease ranks and conditions caused by the progression of the illness.

MICRO-MONSTERS

A good deal of the threat associated with microbes is a matter of scale: at the microscopic level, they can afflict a host’s system, but reduce characters to their level, or bring microbes into the “macro”-sized world and... look out!

A common comic book element is heroes shrunk down to microscopic scale, faced with invading microbes or even white blood cells convinced they are invaders! Likewise, mad science might enlarge otherwise invisible microbes into giant monsters! Either way, you can use the Blob monster archetype from **Chapter 3** of the *Gamemas-*



ter's Guide for the general traits of a giant-sized microbe (whether it's actually giant-sized, or just seems that way from the perspective of a tiny character). The Giant Flytrap archetype can also serve as a model for some equally-sized protozoa or the like.

CLONING

Cloning—especially human cloning—is a staple of the comic books. Generally, it involves the creation of a forced-growth from a mature cell sample, often with some type of mind or memory transfer (or outright brain transplant). That is, clones can be grown from a DNA sample from an adult human being (rather than requiring embryonic cells) and can be grown to maturity much faster than they would develop naturally, plus there is a means to give the clone memories, knowledge, and a personality (perhaps that of the donor, perhaps not) rather than ending up is a “blank” and mindless clone. All of these various things make cloning super-science, requiring a power, device, or the Inventor advantage.

IMMORTALITY

One of the simplest uses for cloning is to provide the donor with a new, presumably younger and healthier, body when the old one wears out or suffers illness or injury. If the subject's mind is transferred into the new body, it is like the Immortality effect from the *Hero's Handbook*, with the interval for the character's return to life being the time needed to grow and “activate” the clone.

This kind of cloning is the same as the Nano Backup trait from **Gadget Guide: Nanotech**.

DUPLICATION

A clone can be force-grown from a still living person in order to create a living duplicate (who may or may not be the same physical age and condition as the original). There are any number of reasons why someone might do this, not the least of which are creating a duplicate loyal to its creator as an infiltrator or spy, or making multiple copies of a person with useful abilities. The cloned legions of SHADOW are one example of duplicates designed for loyalty far exceeding that of any normal human recruits.

Duplication of specific characters can be treated like a Summon effect, particularly for inventing (or the magical equivalents).

Example: With a sample of Princess' blood, Dr. Azoth creates a homunculus-clone in an alchemical bath. The GM determines that a Summon 10 effect is needed, for a DC of 30 (10 + a 20-point effect), which Azoth can accomplish routinely with his Expertise: Alchemy bonus. It takes him about a week's work: 20 hours of research and preparing the alchemical bath, and another 20 hours of growing and preparing the homunculus before she can emerge. Then the new “Princess” is set to infiltrate the Sentinels!

THE DNASCENT PROCESS

In the *Earth-Prime* universe (the setting of *Freedom City* and *Emerald City*) the research arm of the Labyrinth has created a genetic resequencing technique known as the “DNAscent Process.” Initially developed about thirty years ago in the early stages of genetic research and testing, the process produced more failures than successes. Even now, it is risky, sometimes resulting in out of control mutations or aggressive cancers, or inflicting permanent brain damage or psychological trauma on its subjects. The process is illegal in most of the world, although a few governments (including the United States) have acquired enough data to replicate the process, if they want to do so.

The process consists of a series of designer drugs and tailored viruses administered to the subject over a number of days, which create a series of genetic changes, “unlocking” latent potential. The most common benefits are physical—enhanced strength, toughness, speed, and so forth—but physical mutations or even psionic abilities are known. The “basic” process provides powers, at a street cost of about \$10,000 per power point of traits, but the new powers only last for about a month per power point before they begin to fade, being completely gone in the same number of days unless further regular drug treatments are applied. Targeted radiation treatments can “fix” the process and make it permanent, but have their own side effects and have been known to trigger random mutations or cause severe trauma.

Access to the DNAscent Process is primarily through the Power-House, a front for the Labyrinth that provides super-powered henchmen and pit fighters to anyone able to pay their prices. The Labyrinth also continues to experiment and refine the Process in secret, turning its most promising subjects into its agents, although more than a few have escaped over the years and devoted their lives to shutting down the experiments and exposing the Labyrinth (no small task, considering how long the conspiracy has been around).

For in-game application of the DNAscent Process, use the **Quick-Start Character Generator** to determine powers, limited to just the Powerhouse archetype (for the basic process) or that plus Elemental, Energy Controller, Mimic, Paragon, Psychic, Shapeshifter, Speedster, and Warrior for the full process, re-rolling any other archetypes.

TRANSFORMATION

While clones start out as genetic duplicates of their donor, they do not have to stay that way. In fact, they can be modified in a number of different ways during the creation process.

Genetic engineering (following) may alter the original DNA, causing the clone to develop and mature differently, ranging from small “tweaks” like eye color to a change in sex or even complete changes in morphology.

The process of “implanting” the clone’s mind and memories may be tailored to give the clone a different personality, beliefs, preferences, and so forth. While physically identical, the clone could be an entirely different “person” mentally and psychologically.

Similarly, if some type of mind recording and transfer technology is available, or if comprehensive brain transplants are possible, then the clone could be a “host” body for a different personality. Imagine a dying super-criminal transplanted into a clone copy of his arch-foe, for example!

GENETIC ENGINEERING

Understanding the genetic “blueprint” and how it works opens up possibilities for rewriting those plans, changing an organism’s genetic “destiny” and custom-designing life forms for a diverse range of purposes. A good deal of biotech is based on the availability of genetic engineering to create the necessary organisms, or to modify existing ones.

EMPOWERMENT

If super-powers have a genetic basis (and, in most settings, many of them do) then genetic engineering may be

able to isolate the genes and sequences that grant certain powers and deliberately engineer people who have them.

Of course, it may not be so simple. First is the challenge of actually isolating and mapping the genetics, which may lead unscrupulous researchers to kidnap “test subjects” or take their DNA by force or subterfuge. Then there is the matter of testing if the new gene sequences do in fact grant powers, usually with more test subjects, who may be even less cooperative once they’re empowered. The process might also only grant the epigenetic *potential* for powers, needing some type of catalyst to activate it and influence how the potential expresses itself.

Still, even the potential of “home grown” superhumans is considerable, and many factions will devote considerable resources towards pursuing it. See **The DNAscent Process** sidebar for details on a genetic empowerment process in the *Earth-Prime* setting for *Freedom City* and *Emerald City*.

UPLIFTING

Uplifting is the process of granting sentience to non-sentient species (or individual members of a species). It usually involves some genetic engineering, intended to make the uplift permanent and—in the case of a whole species—allowing it to be passed on to future generations without the need for continued maintenance or modifications.

The basic effect of uplift is adding higher Intellect and Presence ranks to an animal species archetype from the *Hero’s Handbook* or *Gamemaster’s Guide*, but the process usually tries to take into account the ability to use that enhanced intelligence as well, providing manipulative appendages, vocal capabilities, and movement capabilities for species lacking them.

For example, three common “candidate” species for uplift are chimpanzees, dolphins, and octopi (all believed to be fairly intelligent). Chimps need the least modification, but still lack a human voice box. Aquatic creatures like dolphins and octopi need additional capabilities in order to function on land, including body support, locomotion, and manipulators (in the case of dolphins). Most of these additions simply involve removing complications animals face that humans do not, and may still leave the uplifts with some physical Disabilities or related complications due to their unusual physiology.

BIOMODIFICATION

In addition to “designer genes,” biotech may modify existing life forms in different ways.

CHIMERAS

A *chimera* is an organism made up of cells with distinct genetic differences, that is, some of its cells are genetically unrelated to others. It is named for the mythic creature made up of parts of different animals, including a lion, a goat, and a serpent. With biotech, chimeras may be creatures “spliced” together from different parts, or that have foreign genes (and therefore traits) introduced into their bodies, deliberately or accidentally.

A classical literary chimera is “Frankenstein’s monster,” a reanimated humanoid made out of different organs and parts harvested from corpses and animated by a “spark of life.” Such a creature might have superhuman abilities, including strength and toughness.

Another classic type of chimera is a human-animal hybrid, usually humans altered with animal genes to give them traits ranging from enhanced abilities and senses to fur, claws, tails, wings, and so forth. See **Power Profile: Animal Powers** for a full range of abilities these types of chimera might have. In a setting where advanced biotech is relatively common, chimeras may even be a fashion statement, with certain people adopting animal-like characteristics as part of their sub-culture.

LIVING TECHNOLOGY

Living technology is creatures used as technological tools, or tools engineered with living characteristics, able to “eat,” heal, and even reproduce, for example.

BIOMANUFACTURING

Living creatures are powerful “factories” for the production of many biochemicals, consuming food (and, in the case of photosynthetic life, sunlight) and producing biomass and waste products. These processes may be harnessed for manufacturing using other tools like genetic engineering, biomodification, and cloning to produce “living factories” for a wide range of things. Examples include “pharm” animals and plants that produce useful biochemicals, which can be harvested,

or genetically modified spiders or silkworms that spin industrial-grade “silk” usable to make cloth or cable with tremendous tensile strength. Accidents involving biomanufacturing processes can also lead to power origins (such as getting bitten by a genetically modified spider...).

SELF-MAINTAINING ITEMS

Growth and healing are primary qualities of life that biotechnology seeks to emulate. While nanotech allows for self-repairing objects and materials (see **Gadget Guide: Nanotech**) biotech may do so by allowing items to emulate living things and “heal” on their own, consuming nutrients or even obtaining power through photosynthesis like plants. As mentioned in the **Nanotech** Guide, the ability to self-repair over time is essentially a rank 1 Feature for most items, the Regeneration power for things like vehicles, headquarters, and constructs.

Self-Maintaining Items: Feature 1 (recovers from damage) for most items, Regeneration for constructs, headquarters, vehicles, and more complex items • 1 point or 1 point per rank.

LIVING VESSELS

Biotechnology may virtually erase the lines between creature, construct, and vehicle in M&M game terms, creating creatures modified for use as a form of transportation, taking the concept of riding animals a stage further, allowing passengers to ride *inside* a living creature. This has benefits: the vessel can heal (self-repair), may be intelligent enough to act on its own (a kind of “autopilot”), and can provide a sealed self-sustaining environment wherein the crew essentially exist as symbionts (or parasites) in terms of life support.

ARCANE MOURNER

117 EP

Size: Colossal **Strength:** 18 **Speed:** 15 (space) **Defense:** 2 **Toughness:** 15 **Powers:** Blaster Batteries (Ranged Damage 12), **AE:** Lamprey Torpedoes (Ranged Penetrating Damage 10, Homing 4), Movement 2 (Space Flight), Regeneration 2, Subspace Wail 6 (Nullify Subspace Communication, Radio Perception Area, Selective, Sustained), **Features:** Autopilot (+4), Communications 2, Computer, Navigation System, Rooms (Hangar, Holding Cells, Laboratory, Living Space, Personnel, Security System, Workshop)

The shapeshifting alien sorcerers known as the Arcane typically use mystic portals to move from world to world, but when they traverse the void between the stars, they have their “Mourners,” living starships that are the last of a noble species once known as the Voidsingers. The colossal whale-like creatures were enslaved by the Arcane long ago and modified by their occult sciences to serve as vessels, their bodies hollowed out and fitted with chambers and suitable comforts, their brains connected with control systems, their hides armored and bristling with weapons. Their once exultant subspace songs have become an endless dirge that jams other signals, helping to block communications when the dread ships of the Arcane appear in the sky.

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