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### **The Search for a Hero Gene: Fact or Fiction?**

Olivia Efthimiou<sup>1</sup>

*Murdoch University*

#### **ABSTRACT**

The radical entry of heroism research into scientific inquiry presents interesting challenges and possibilities for the study of heroism and the human condition more broadly. This ‘final frontier’ of the enduring phenomenon of heroism stands to offer remarkable, unprecedented, and controversial advances in our understanding of heroic and human behaviour. Is a genetic basis for heroism a real possibility? If so, what would its impacts be? Advances in genomics and increased interest in the fields of epigenetics and neuroplasticity might hold the key to its discovery. This article considers some of the leading emerging research in global health genomics and speculations in the scientific study of heroism, and its potential interrelationship with genetic and epigenetic well-being.

*Keywords:* hero gene, heroism science, epigenetics, genomics, well-being, heroism

#### **Introduction**

Renewed interest in the study of heroism over the past decade is advancing our understanding of this elusive optimal human behaviour at a rapid pace. The question of a ‘hero gene’, however, still remains the elephant in the room; the idea that good and evil could be in some way genetic in basis, leading to pre-determined actions written into our very make-up is still met with great scepticism. Researchers have tried to move away from deterministic and gene-centric notions of humanity with the advent of fields that are dedicated to understanding human behaviour from a number of perspectives (gender, culture, ecologies, socioeconomic status, spiritual, education etc.). The role the environment plays and one’s reaction to it is emerging as a key determinant in shaping one’s identity and sense of self with the rise of cutting-edge scientific discourses such as neuroplasticity and epigenetics. These issues have been receiving considerable media and popular attention in documentaries such as *Ghost in Your Genes* (2007), *The Brain that Changes Itself* (2010), and such websites as [Lumosity.com](http://Lumosity.com) which is designed to train any person’s brain to enhance functionality.

#### **From Science Fiction to the Hard Science of Heroism**

The idea of a hero or superhero gene, and that DNA can be manipulated to produce human beings with extraordinary powers, has been the preoccupation of various science fiction story arcs such as *Heroes*, *Spiderman*, *The Incredible Hulk* and *Beauty and the Beast*.

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<sup>1</sup> [heroismscience@gmail.com](mailto:heroismscience@gmail.com)

However, this fanciful and radical idea is slowly starting to become more science than science fiction, with the emergence of narratives of the human genome and human biology which can add a little explored and interesting dimension to our understanding of heroism. In 2009 a gene named “KIFAP3 (Kinesin-associated protein 3)” that can prolong the lifespan of motor neurone disease sufferers was identified by British scientists – significantly, this has been dubbed a “‘hero’ gene [emphasis added]”. Professor Armar Al-Chalabi of the MRC Centre for Neurodegenerative Research at King’s College London emphasised the importance of such findings that are geared towards exploring the less common scientific approach of identifying “survival genes ... [T]reatments need to be aimed at improving survival, not reducing risk” (Daily Mail, 2009).

Recently, the finding of the advanced regeneration gene “Lin28a” has been dubbed a “Wolverine healing gene” in science’s search for “the magical code that could enable us to regrow organs and regenerate limbs”, borrowing the term from the homonymous superhero in the science fiction comic series and films *X-Men* in the online article (Clark Estes, 2013). Connected to the hero ascription to KIFAP3 in motor neurone disease is the discovery of the mutation “that causes low activity in the MAO-A gene” or “monoamine oxidase” – in an article titled “Triggering the “Warrior Gene” in a Villain or Hero” Kaufman (2011) outlines how increased levels of the chemicals produced by this mutation result in “higher levels of aggression”. This is reminiscent of the notable research by Dunbar (2008) into the feared Viking warriors named “Berserkers” who continued to act out their overtly violent behaviour even in times of peace, suggesting a biological predisposition to this aggressive type of heroism (aside from explanations proposing drug-induced behaviour).

The presence of a hero genotype has been speculated in two online articles: McTighe (2010) and Forrest (2013) both ponder if such a gene exists, predisposing the men that are the focus of the articles towards their heroic selfless actions, where ‘normal’ people would hesitate. Psychologist Jennifer Hartstein was posed the question in the US talk show *Early Show*, prompted by Hollywood actress Kate Winslet saving Richard Branson’s mother from a house fire (News, 2011). Hartstein responded that “very little research has been done on the hero gene” and no such contributing biological factor has been identified.

### **Heroism: An Epigenetic Rule?**

The interplay between nature and nurture in neuroplasticity, and the value that such a multi-dimensional epistemology can add to our understanding of behavioural constructs such as heroism, are exemplified in Wilson’s (2001, p. 14) concept of “epigenetic rules”. In the scientific world, there are a number of definitions being cast to explain the underlying processes of epigenetics; one of these attempts at outlining the basic premise of the concept is that “Epigenetics is the study of heritable changes in gene expression that occur without a change in DNA sequence” (Wolffe & Matzke, 1999, p. 481). In lay terms, what is crucial to the complexity of epigenetics is the effect that the environment can have on switching genes on and off and therefore the face of an individual’s “epigenome”; this complex process of nature and nurture is considered to be the key to understanding diverse phenomena from the shaping of behavioural identity to diseases (Mehler, 2007; as cited in PBS, 2007). Hurley (2013, p. 3) describes how “According to the new insights of behavioural epigenetics, traumatic experiences ... in our recent ancestors’ past, leave molecular scars adhering to our DNA”. On the flipside, this can also be true of the heritability of “strengths and resiliences” in positive and enlightening experiences in our ancestral past (Hurley, 2013, p. 3), such as heroism.

By tapping into the hero epigenome and its regenerative properties it may be possible to conceive of the development of not only more effective life strategies at a psychosocial-spiritual level, but chemical or natural compounds at the medical level – in what is perhaps the most fascinating unfolding story of ‘genomics meets heroism’ [\*The Resilience Project\*](#) led by Dr Stephen Friend at Sage Bionetworks and Dr Eric Shadt at the Icahn School of Medicine at Mount Sinai, is a global study looking for unique individuals or “Genetic Heroes” “who have demonstrated unusual resilience to debilitating diseases and genetic mutations (Carter, 2014). This startling approach is prime evidence that the way we are looking at disease, well-being and the human condition is shifting ground at the nexus of ‘science meets culture’. It is an open call for us to become active participants as co-authors in the story of our human genome.

### **Heroism as a Model for Regeneration and Well-Being**

Pioneering research such as *The Resilience Project* echoes Al-Chalabi’s (2009; as cited in Daily Mail, 2009) sentiment that scientific treatments need to begin to be more positive and preventative in their approach, and shift focus onto well-being rather than disease. Indeed, David Sinclair’s research from Harvard University is driven by the search to find a broad-spectrum epigenetic solution to promote longevity and overall well-being. Sinclair (2013; as cited in SBS, 2013) notes that “Simple organisms, even yeast cells and fruit flies, have ‘longevity genes’ ... When these genes are ‘switched on’, they can protect the organism and help them live longer”. Sinclair (2013; as cited in SBS, 2013) states with confidence that science will be able to discover these genes by the mid 21<sup>st</sup> century. Medical discoveries such as those of “supercharging proteins [which] can impart unusual resilience” are already contributing to this emerging enterprise – Lawrence, Phillips, and Liu (2007, p. 10111) outline how “Protein supercharging illustrates the plasticity of protein surfaces” revealing previously unknown pathways for the human-organism’s self-healing properties. These research trends in the biological sciences are mirroring increased momentum in the social and psychological sciences in positive behaviours and optimal human functioning such as motivation, resilience, altruism, courage, human growth, and finally, heroism and heroic leadership. Such shift in thought across disciplines could promote intergenerational well-being and increased capacity to regenerate following exposure to trauma, both physical and psychological.

In this context stories are now emerging of the potential of every individual to literally heal their genome – medical practitioner Rossi (2010, pp. 62, 65, 67) outlines and demonstrates through scientific data such as evidence of “stem-cell activation”, how the “ideo-plastic paradigm” lies at the heart of his “creative psychosocial genomic approach to therapeutic hypnosis”. Rossi (2010, p. 62) uses hypnosis to epigenetically “alter neural networks and gene expression for the health and well-being of the client”. Likewise, alternative practitioner Carol Roberts uses “genome healing” which is a result of a “number of healing practices” based on heterodox disciplines “first introduced in Russia over 20 years ago”, to assist patients with various physical and emotional traumas to communicate with their genes, stem cells and so forth (Abraham, 2012). Baird’s (2010) aptly titled book *Happiness genes: unlock the potential hidden in your DNA*, builds on these emerging narratives and highlights the power of epigenetics and the opportunity to heal ourselves by increasing consciousness of our choices and actions. Baird (2010) argues that ‘caveman’ selfish genes wired for survival feature as higher priority evolution-wise, in contrast to altruistic or happiness genes. Baird (2010) proposes that epigenetics holds the key to reversing this evolutionary pre-disposition

and unlocking our hidden potential, invoking a timeless noble and heroic epigenetic pursuit of happiness.

The reinstatement and recognition of the importance of heroism in the 21<sup>st</sup> century is significant in terms of redefining our concept of well-being in contemporary culture. The increasing prevalence of mental health disorders has been recognized as part of “public health’s 21<sup>st</sup> century mission” (Neugebauer, 1999, p. 1309). Introducing the concept of “The banality of heroism” (Franco & Zimbardo, 2006) escalates its centrality in everyday life, leading the way to a system in which everyone is a potential hero – a recent study conducted by Igou, Ritchie, and Kinsella (2012) has highlighted “the importance of heroism in everyday life”. This study acknowledges the wide-reaching effects of the phenomenon across the spectrum of human experience: “The term hero is universal and understood to provide important physical, psychological, and social benefits to people” (Kinsella, 2013, p. 1). The development of more integrative and open-ended medical and well-being frameworks, that foster personal empowerment through everyday heroism and the construction of a coherent and purposeful personal narrative, could therefore be central to the broader agenda of improving mental, physical and spiritual public health in the 21<sup>st</sup> century.

## **Conclusion**

As more scientists shift their focus to studying the evolutionary and biological bases of human behaviours, the discovery of a hero gene or sets of genes will become a greater possibility. An advanced understanding of the process and function of the silencing and activation of genes, and the continued decoding of the human genome and our knowledge of its complex interrelationship with environmental factors, will be instrumental to this endeavour. Perhaps only two things are certain: this enterprise of heroism science will require an open mind, innovative spirit and creativity from researchers across many walks of academia, and the impacts of such a discovery though largely unpredictable, stand to change the face of humanity as we know it forever.

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*About the author:*

Olivia Efthimiou is a transdisciplinary researcher. Her work has been published in *IM: Interactive Media* and the *Journal of Conscious Evolution*. She is one of a group of international authors featured in the *Handbook of Heroism and Heroic Leadership* (forthcoming, spring 2016), the first definitive multiple disciplinary edited volume on heroism science scholarship. She is the website creator and administrator of [Heroism Science – Promoting the Transdisciplinary Study of Heroism in the 21st Century](#) and lead Editor of [International Advances in Heroism Science](#).