A primary task of ethics is to recognize valid distinctions in the face of uncertainty concerning moral obligations. When wrestling with life’s toughest questions, facts are often incompletely accessible or their interpretations ambiguous. Available theoretical approaches often yield conflicting solutions. When confronted with healthcare dilemmas, in particular, people differ in how they prioritize and apply their personal values to reach decisions that entail life-altering consequences.

These are the grey matters of bioethics. Their blurry contours outline what is known, what can be done, and what should be done. Somewhere between bright evidence and unfathomable unknown, between lucid right and shadowy wrong, between decisive resolve and oblivious apathy, lies a vast expanse of ethical grey.

Bioethical greyness is anything but dull. Things unelucidated challenge the mind to explore and wonder. Matters undecided invite heartfelt reflection, abstract reasoning, serious discussion and debate. Greyness allows openness to creative interaction.

Nor is greyness absolutely impenetrable. For those who dwell amidst ethical grey, greyness teaches the worth of clarity, which must be patiently sought. Greyness is an ever-present reminder of human finitude. Its ambiguity inhibits our fixation on things that are fading and of no lasting consequence. Its indefiniteness suggests that what most strongly motivates us may not be what is immediately visible. The lack of clarity along grey’s continuum compels the restless mind to seek what lies beyond. How life is lived depends on what grey dwellers make of shades
of grey. Grey matters.

It is, of course, grey matter that bioethicists bring to bear on these grey matters. The grey matter refers to that part of the brain, which, if sliced open, appears grey?in contrast to myelinated white matter?and consists of the cerebral cortex as well as the subcortical nuclei such as the hippocampus, thalamus, and basal ganglia. In general, cerebral grey matter is that part of the brain responsible for information processing, whereas white matter, which connects regions of grey matter, is responsible for information transmission. Grey matter thus has connotations both anatomical and philosophical.

Neuroethics is the realm where cerebral and ethical grey matters interpenetrate. The discipline of neuroethics considers the ethical implications of advances in the neurosciences, drawing from the fields of clinical neurology, neuropsychiatry, neuropsychology, neuroimaging, neuropharmacology, neurogenetics, neuropathology, nanomedicine, and computer science. The neurosciences are yielding exciting capabilities to measure healthy and disordered brain function, to detect and alter the course of brain diseases, as well as to understand the nature of the neural processes that correspond to the human mind. The potential health benefits of neuroscience are enormous. The implications for ethics are profound, for the object of neuroscientific study is the very organ that engages in ethical contemplation.

As neuroscience probes the intricate structure and cellular behavior of grey matter, the scientifically informed brain is challenged in new ways to comprehend its own nature, its origin, its purpose, and its relationship to others. Not only are bodily perception and movement subject to scientific investigation, but with the advent of functional imaging techniques and less invasive methods of stimulating the brain, neuroscience is able to offer increasingly sophisticated descriptions of the neural basis of higher cognitive functions. These include aspects of moral reasoning, intention, consciousness, empathy, belief, and spiritual experience. Functional imaging studies of higher cognitive functions are identifying and mapping configurations of grey matter activation that correspond to thoughts that previously were the exclusive domain of private reflection or which occur beneath the threshold of conscious awareness.

The neural pathways that subserve moral judgments and ethical reasoning are coming into scientific view in unprecedented detail. Their interpretation falls to grey matter. How society assigns meaning to the brain phenomena that correspond to social interactions, personal beliefs, moral conscience, philosophical analysis, as well as the drive to conduct scientific research has intriguing implications for human self-understanding and its translation into culture.

Consider the far-reaching implications of neuroscience for ethical decision-making. Do subjective judgments carry moral weight if they can be shown to arise from brain states describable in physical terms? Might physical models of the brain invalidate the wisdom of moral repugnance?[1] Should what has been called the ?yuk factor,[2] be understood simply as a conditioned neurochemical reflex? Are reason and logic reducible also to cerebral biochemistry? Can physical models of the brain succeed in explaining away religious belief? How might human thought be a given reality, and how might it?and ethics?become subject to reshaping?

Neuroethics also has subtle implications for the character of human interaction. What boundaries should be respected in order that innovative freedoms of communication do not excessively intrude into personal privacy? As powerful new computers augment their performance by more
closely imitating the brain, and become more user-friendly by mimicking the outward expression of human emotions, shall we in turn find ourselves imitating our computers in a quest for maximum efficiency? What is it about human language that transcends sheer information transmission?

Further questions for neuroethics concern the proper place and limits of medical models of human thought and behavior. Should drugs be used to enhance cognition in normal individuals? When is it appropriate to manage social misbehavior with psychotropic medications? Would it be wise to edit away unpleasant memories if that were possible?

Neuroethics also has implications for the integrity of personal responsibility. Can neuroscience demonstrate whether mental agency is determined or free? What should be the role of neuroscientific evidence in ascertaining legal responsibility for crimes?

Many will recall Agatha Christie’s fictional detective, Hercule Poirot, who brilliantly solved crimes by use of what he called his "little grey cells."[3] Poirot’s success notwithstanding, contemporary neuroscience recognizes that intelligence is also a matter of how well the grey regions of the brain intercommunicate. Whereas grey matters, grey is not all that matters.

Likewise, neuroscience matters, but it should be remembered that physical descriptions cannot supply a complete explanation of the human mind. A nuanced view of neuroethics recognizes that, between the lines of black and white data that neuroscience generates lie shades of meaning irreducible to material mechanisms. Great thoughts do not consist in clusters of reflexively firing neurons, although neurons may represent them. Amazingly, it is neurons that give expression to the human longings that inspire moral imagination. Such aspirations brightly overshadow the greyest grey.

As we welcome progress in neuroscience, let us conscientiously explore the fullness of neuroethics. The journey into neuroethics will not have been exhausted when the hairs of generations to come have turned grey.

References


