Introduction

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Addressing the deep ontological and ethical questions raised by the field of genomics, named here “the Genome Question” (GQ) represents one of the key challenges that both religious and non-religious ethical traditions face in the modern time. This holds true to the Islamic tradition; one of the main and fastest-growing world religions. The international library is now replete with academic publications which address the GQ from secular bioethical perspectives. When it comes to the religious perspectives, the list of available publications considerably declines. When it comes to genomics and Islamic ethics in particular, one can hardly come across any distinct publication. This volume is meant to fill in this gap, without claiming to be all-inclusive, and to open up new venues for future studies and publications in this field.

Before reviewing the various chapters included in this volume, it is pertinent to explain what we mean by the “Genome Question” and how it should be addressed from an Islamic bioethical perspective. The GQ widely includes, and certainly not limited to, a set of ethical questions raised by the cutting-edge technologies of genomics, which the Islamic tradition would ordinarily respond to by providing immediate and short-term answers through judging specific applications, like genomic testing, DNA paternity and selective abortion, through the lens of ethics. This usually happens by employing tools from the discipline of Islamic Jurisprudence (*fiqh*). The authors who contributed to this volume could strongly argue that the GQ goes much further and deeper than exploring how far certain technologies in particular situations are (in) compatible with specific ethical traditions. The GQ is much broader in scope than these direct ethical questions which appear on the surface. The field of genomics itself needs to be critically examined, because the very birth and further progress of genomics are, implicitly or explicitly, indicative of certain perceptions we hold about ourselves as human beings (including individuals, families and societies) and the ways through which we answer questions like:

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What makes us distinctively human? Are genome and soul related? If yes, in what way? Is our human identity fixed and we must keep it intact, or is it evolving in nature and we can/should always try to improve it, this time through “fixing” or “enhancing” our genome? What kind of individuals, families and societies would result, dominate or die out because of the genetic/genomic technologies which (will) allow choosing the sex of the children in addition to certain physical and cognitive characteristics?

The breadth and depth of the GQ, we argue, should be coupled with a parallel breadth and depth in the Islamic ethical discourse for two main reasons. The first reason deals with the complex and multidimensional nature of the GQ itself. The larger and deeper questions of genomics, even some of the direct and specific questions, cannot be properly addressed by depending exclusively on the discipline of *fiqh*. The second reason attends to the nature and scope of the field of Islamic Bioethics, as we envisage it. As it is the case with the field of mainstream bioethics, Islamic Bioethics is to be characterised with interdisciplinarity. Besides the discipline of *fiqh*, Islamic bioethical discourse should truly reflect the richness of the Islamic tradition by incorporating insights from a broad spectrum of other disciplines including philosophy, theology, Sufism, Qur’ān exegesis, Hadith commentaries, belles-lettres (*adab*), ... etc. Alongside these disciplines, usually imprecisely called “religious” sciences, Islamic Bioethics should also benefit from the critical perspectives developed by social sciences and their interaction with biomedical sciences, like medical anthropology and medical sociology. By incorporating social sciences in the Islamic bioethical discourse, people can reach more comprehensive and informed conclusions in which not only the “ought” aspect will be examined, but also the “is” aspect, sometimes called in Islamic literature as people’s realities (*aḥwāl al-nās*). Exploring *aḥwāl al-nās* and incorporating them into the contemporary Islamic bioethical discourse, in our view, cannot be made through conducting surveys only. What is needed is a much more sophisticated analysis, which takes into consideration the nuances of lived experiences, power imbalances, and the particularities of certain (sub-)communities, ... etc. The more difficult question to study here is how the perspectives and insights coming from social sciences will be integrated in the Islamic religious discourse on making moral judgement and determining the ethically acceptable and objectionable choices.² There is, however, another layer of interdisciplinarity that needs to be considered for Islamic Bioethics, viz. engaging with bioethical

2 For critical remarks on the interplay of social science and bioethics, see Callahan 1999, 275-294.

deliberations from outside Islamic tradition, including both the religious (e.g. Jewish and Christian) and secular discussions.

Striking a well-justified balance between these different layers of interdisciplinarity will remain a real challenge for those who want to engage in seminal contributions in the field of Islamic Bioethics. It is not so difficult to uncritically adopt/reject bioethical perspectives developed outside the Islamic tradition and justify their supposed (in)compatibility with Islam just by quoting passages from the foundational scriptures of Islam, namely the Qur'an and Sunna.³ On the other hand, it can hardly be methodologically justified to approach ethical questions triggered by biomedical technologies, which were produced outside the Islamic tradition, by focusing exclusively on one discipline within the Islamic tradition, namely *fiqh*. This position, however, does not mean that *all* these levels and dimensions of interdisciplinarity should *always* be integrated in the Islamic discourse on *any* bioethical issue. Undoubtedly, this is not feasible as various factors (e.g. the nature of the issues at hand, the (un)availability of experts, and the different settings of the discussions) should be considered before deciding to what extent the interdisciplinary the Islamic bioethical discourse should be. While preparing for the seminar whose proceedings are published in this volume, we tried to solicit contributions which guarantee as much interdisciplinarity as possible. This explains the inclusion of chapters which analyse insights from ethical traditions outside Islam. During the seminar, these contributions were fully integrated in the deliberations. Over and above exchanging ideas and critical remarks throughout the seminar, the authors of these chapters were asked to prepare written responses on other chapters, which address genomics from an Islamic perspective. Additionally, the other participants were asked to prepare written responses on these chapters and to present them during the seminar. These procedures did improve the cross-fertilization of ideas and insights among all participants, which will hopefully be reflected throughout this volume. As for the chapters which approached the GQ from an Islamic perspective, interdisciplinarity was also underscored. Although we completely defend the centrality of Islamic Jurisprudence (*fiqh*) in developing an authentic Islamic ethical discourse, we equally problematize the proposition which reduces Islamic ethics to *fiqh* only. As explained above, many other disciplines, as well as *fiqh*, should be employed and operationalized in order to produce a rigorous and productive Islamic ethical discourse on genomics. The contributions included in this volume explored how insights from disciplines like philosophy, theology and Qur'an exegesis

3 For some illustrative examples of this approach when principlism was examined from an Islamic ethical perspective, see Ghaly 2016, 6-27.

can be of added value in this regard. Unfortunately, some disciplines, such as Sufism, are not covered in this volume. This is due to the fact that we could not find experts in Sufism with interest in exploring genomics-related issues. Moreover, the volume does not include contributions from social scientists. This is partially because the field of genomics has just recently found its way into the Muslim world and thus there is still no concrete “social reality” of genomics research to be explored.⁴ We anticipate that these and other missing aspects will be attended to in future studies.

Part 1: Collective *Ijtihād* and Genomics

In order to put the discussions on the interplay of Islamic ethics and genomics in their proper context, the first part of this volume fathoms out the contemporary Islamic bioethical discourse by highlighting some of its distinctive features. In order to develop an ethical position rooted in the Islamic tradition, one needs to consult its two main scriptural sources, namely the Qur’ān and Sunna. Like many other topics, one cannot expect finding direct answers to the questions raised by the field of genomics by surveying the content of these two Scriptures. Thus, developing an Islamic ethical position necessitates exerting extra intellectual and scholarly efforts guided by a set of methods and principles developed throughout the Islamic history. The whole process, commencing from the point of understanding the question or the issue at hand leading to deducing the religious ruling (*ḥukm Shar’ī*) or developing the ethical position, is known in the Islamic tradition as *ijtihād*, which literally means exerting one’s utmost effort (Weiss 1978). For various reasons, some of which are explained in the chapters included in this part, Muslim religious scholars collaborated with biomedical scientists and thus the process of *ijtihād* became collective in nature (Ghaly 2015).⁵

The first chapter in this part, “Sharia Scholars and Modern Biomedical Advancements: What Role for Religious Ethics in the Genomic Era”, presents a historical review of contemporary Islamic Bioethics, which goes back to the beginning of the twentieth century. Unlike the field of mainstream bioethics where religion gradually lost its central role, in this chapter, Mohammed Ghaly explains how Muslim religious scholars continued to play a central role in constructing and shaping the Islamic bioethical discourse. Building upon the the-

4 For the status quo of genomics in the Muslim world and more particularly in the Gulf region, see Ghaly 2016a.

5 For more information on the concept of *ijtihād*, see Weiss 1978.

sis “Sharia is valid for all times and places”, shared by Muslim religious scholars, they acquired the challenge of demonstrating how the religio-ethical system of Islam (Sharia) is still viable enough to address the vexing questions raised by modern biomedical technologies. Ghaly also highlights the difficulties that these religious scholars encountered in this regard because of their educational background. This usually focused exclusively on mastering the Arabic language and the disciplines of knowledge that help these scholars understand the Islamic Scriptures, namely the Qur’ān and Sunna. Because of this genre of “religious” education, Muslim religious scholars had no access to updated biomedical information, and most of them could not read first-hand sources. This situation necessitated employing an interpretive mechanism through which Islamic Scriptures will be approached collectively, rather than individually, through a group of people who will collaborate to deduce religious rulings and ethical judgments compliant with Sharia. The chapter explains how this mechanism, known as collective *ijtihād*, functioned within the field of Islamic Bioethics, and what developments this mechanism went through from the beginning of the twentieth century up to the current genomic era. The chapter also raises some critical remarks about how the very term “Sharia” is to be defined.

As a follow up for the first chapter, the second chapter, “Islamic Ethics and Genomics: Mapping the Collective Deliberations of Muslim Religious Scholars and Biomedical Scientists”, analyzes how the mechanism of collective *ijtihād* was employed to address the Genome Question (GQ). In this chapter, Mohammed Ghaly presents a comprehensive overview of the key conferences and expert meetings which facilitated the interdisciplinary discussions among Muslim religious scholars and biomedical scientists, from the beginning of the 1990s onwards. Ghaly identified two main approaches in these discussions, namely the “precaution-inclined approach” and the “embracement-inclined approach”. Within the precaution-inclined approach, genomics is perceived as something almost alien to the Islamic tradition and thus should be approached with great caution. For instance, the advocates of this approach argue that genomics-associated technologies are in principle forbidden unless proved otherwise, and that Muslims should rather wait for concrete research results before joining the genomic revolution. On the other hand, the advocates of the embracement-inclined approach contextualize genomics within the call of Islam to search for beneficial knowledge (*‘ilm nāfi*), which God made accessible to all humans who work intensely. Within this approach, genomics is not only something permissible, but it is seen as a collective duty (*farḍ kifāya*), which means that Muslims are collectively required to engage in and contribute to. Recent developments in the Muslim world, especially in the Gulf region, showed that the second approach proved to be more appealing. However, the

advocates of both approaches agreed that Sharia-based determinants (*dawābiṭ Sharʿiyya*) should be developed in order to guide the research in the field of genomics and its resulting applications and technologies.

The final chapter in this part, “Transformation of the Concept of the Family in the Wake of Genomic Sequencing: An Islamic Perspective” by Ayman Shabana, explores the details of some of the Sharia-based determinants (*dawābiṭ Sharʿiyya*) developed through the mechanism of the collective *ijtihād*. These deal with the family institution, which has a pivotal place in the ethical edifice of Islamic tradition. Within this edifice, each family has a certain ideal, with its own structure, characteristics and regulations governing the relationship among the members belonging to this institution. Genomics and associated technologies have not only challenged some aspects of this family ideal, but also created new possibilities for reshaping some constituents of this ideal. This chapter examines how the collective deliberations among religious scholars and biomedical scientists addressed these challenges, in addition to the opinions of individual scholars, and whether the newly created possibilities should be seen as ethically defensible or objectionable options. These questions are addressed at the hand of three applied examples, namely premarital genetic testing, fetal sex selection and germline genetic modification.

Part 2: Genomics and Rethinking Human Nature

After setting the scene and examining the status quo of Islamic bioethical deliberations on genomics, the second part of this volume tries to impose new frontiers, explore new dimensions, and raise some of the deep questions which were not (fully) covered in the discussions facilitated by the mechanism of collective *ijtihād*. The main thread which connects the three chapters included in this part is exploring how human nature can/should be comprehended, revisited or even reshaped in the light of genomics and the new possibilities it has created. In the first chapter “Conceptualizing the Human Being: Insights from the Genethics Discourse and Implications for Islamic Bioethics”, Aasim Padela argues that formulating an ethical position towards complex issues in the field of genomics are usually premised on specific ontological perceptions about the nature of the human being, although these ontologies sometimes remain implicit and unspoken. Based on an extensive literature review, Padela holds that Western bioethical deliberations on issues related to genetics and genomics are indicative of three main ontological perspectives, which perceive the human being as (a) a data store that houses information, (b) a reproductive organism, or (c) an evolving biological entity. Each of these ontological per-

ceptions, Padela argues, impacts the ethical conclusions adopted by Western bioethicists. Padela's proposal for improving the religious, and particularly Islamic, bioethical discourse on genomics is not only to evaluate the technological applications by counting the strengths and weaknesses or the direct benefits and harms of each application but also by questioning and critically examining the underlying ontologies.

The second chapter, "Islamic Perspectives on the Genome and the Human Person: Why the Soul Matters" by Mehrunisha Suleman and Arzoo Ahmed, can be seen as a natural extension of the ontological discussions outlined by Padela, but with more focus on the Islamic tradition. The two authors start from the premise that the information unlocked by human genetics and genomics greatly influenced how we perceive our human nature. Against this backdrop, the chapter examines the relationship between the genome and the human person. A substantial part of the chapter is dedicated to studying the concept "soul/spirit (*nafs/rūḥ*)", and associated terms. The authors surveyed the references to these terms in the Qur'ān and how they were analysed by Qur'ān exegetes, philosophers and theologians. The aim here is to explore how such narratives rooted in the Islamic tradition can provide novel perspectives to the understanding of the human person and the ethical considerations surrounding genomics. The chapter adopts an interdisciplinary approach by engaging insights from different disciplines within the Islamic tradition, especially Quranic exegesis, Islamic theology and philosophy.

The last chapter in this part, "The Ethical limits of Genetic Intervention: Genethics in Philosophical and *Fiqhi* Discourses" by Mutaz al-Khatib, again provides an interdisciplinary investigation of how the new fields of genomics and genetics can influence our understanding of human nature and how far we can subject the human person to these cutting-edge technological interventions. According to al-Khatib, the various ways through which people address such questions are usually determined by one's stance towards other deeper questions, namely on how we understand the nature of genetic/genomic technologies (e.g. are they neutral and value-free, or do they imply certain value judgements, pre-assumptions and convictions?) and how we understand the nature of the human being, especially during the early pre-implantation stage and the following phases of embryonic development. Throughout the chapter, al-Khatib employs the analytical tools of Western philosophy and Islamic jurisprudence (*fiqh*) to see how such questions are (to be) addressed and what kind of similarities and differences exist between these two disciplines.

Part 3: Widening the Scope of Ethical Deliberations

The third part of this volume purposefully aims to enrich the abovementioned levels of interdisciplinarity of Islamic bioethical discourse by incorporating insights from outside the Islamic tradition. In the first chapter, “In the Beginning Was the Genome: Genomics and the Bi-Textuality of Human Existence”, Hub Zwart continues investigating the possible impact of genomics on our understanding of human nature. In agreement with almost all authors who contributed to this volume, Zwart argues that focusing on specific applied issues like selective abortion, artificial reproduction and paternity testing does not do justice to the complexity of the religion-science relationship in the context of genomics. According to him, such an approach would typically present science as the progressive and liberating power and religion as the conservative and restrictive one. Instead of this reductionist approach, Zwart proposes perceiving human existence as the result of a reciprocal interaction between two types of texts, namely the text written in the language of molecular biology consisting of the alphabet of nucleotides, and the text recorded in the religious Scriptures like the Bible and the Qur’ān. Within this proposed framing, Zwart develops what he calls an “occidental perspective” which builds upon the works of prominent philosophers like Hegel, Teilhard and Lacan. Through this perspective, he tries to revisit the relationship between science, represented here in genomics, and religion, particularly world religions like Islam and Christianity.

Just to advance venues for possible cross-fertilization of insights, we refer to the fact that the very idea of having two interrelated texts is not alien to the Islamic tradition. The prominent Muslim religious scholar Ibn Taymiyya (d. 1328) spoke about a similar idea when he divided God’s words into two types, namely “religious words (*kalimāt dīniyya*)” and “universal words (*kalimāt kawniyya*)”. The former is communicated through revealed Books like the Bible and the Qur’ān, while the latter is communicated through the universe (Ibn Taymiyya n.d., 5/8-17). The idea of Ibn Taymiyya received commentaries from contemporary religious scholars. One can see its clear impact on the contemporary school of “Islamization of Knowledge”, especially their ideas about the two readings (*al-qirā’āt*); reading the written Book, i.e., the Quran, and reading the observable book, namely the universe (Malkāwī 1981, 43-57). Thus, our aspirations are for this chapter to stimulate researchers in the field of Islamic Studies in approaching the Genome Question through this lens.

The second chapter, “Creation, Kinds and Destiny: A Christian View of Genome Editing” by Trevor Stammers, presents a perspective on the Genome Question rooted in the Christian tradition. The reader will notice a number of common themes and parallels between this chapter and the second chapter

in Part II, written by Mehrunisha Suleman and Arzoo Ahmed, although each chapter addresses the Genome Question through the lens of a different religious tradition. This became already clear during the seminar, where the three authors benefited from sharing thoughts and critical remarks in improving the earlier drafts of these two chapters. A great deal of this chapter is dedicated to explaining the accounts of creation and Fall and related concepts like *imago dei* (image of God), *sicut deus* (like God), embodiment, dominion and co-creation. Stammers is keen to expose the internal diversity within Christianity on explaining these accounts and concepts. He does so by granting space for different opinions expressed by authoritative voices in Christianity like Irenaeus (130-202 AD), Augustine of Hippo (AD 354-430), and Dietrich Bonhoeffer (d. 1945). He also shows how this diversity continued when contemporary Christian ethicists, like John Wyatt and Ronald Cole-Turner, tried to interpret these accounts and concepts within the context of genomics-related technologies and genomic/genetic engineering. The author also touches upon the question whether genomics could problematize the distinction used to be made by ethicists between therapy and enhancement. Finally, the idea of perceiving the genome as the secular alternative to the religious soul is critically examined from a Christian perspective, with a focus on the question of *telos* or end purpose, which makes the Christian vision sometimes quite different from the secular vision.

The third item in this part is a review essay in which Ayman Shabana presents the book *Living with the Genome: Ethical and Social Aspects of Human Genetics*, edited by Angus Clark and Flo Ticehurst. The material included in the reviewed volume is based on selections from a voluminous work, namely the five-volume and three-million word *Encyclopedia of the Human Genome*. The forty-two chapters included in this volume were meant to provide a collection of concise and accessibly written articles on the social and ethical aspects of human genetics and genomics. Although published in 2006, Shabana argues that the book provides a useful introduction to the range of ethical, legal and social implications of genetics and genomics, most of which remain relevant today. Thus, this is an ideal book to make specialists, and those interested, in Islamic Bioethics aware of the types of ethical questions and modes of reasoning which can be interpreted in international, mainly Western, ethical deliberations. Shabana gives a concise overview of the six main parts of the volume, namely the Human Genome Project; Genetic Disease; Disability, Genetics and Eugenics; Genetics and Society; Genetic Explanations; and Reproduction, Cloning and the Future. In conjunction with presenting the key issues discussed in each part, Shabana also suggests how these issues are (to be) approached from an Islamic bioethical perspective. In addition to the agreements

between what is presented in the reviewed volume and the parallel discussions in Islamic Bioethics, Shabana highlights issues which may create potential tension between the mainstream (Western) bioethical discourse and the Islamic tradition, e.g. the emphasis on individual freedom and autonomy in the former against more inclination towards communitarian ethics in the latter.

Part 4: Contributions in Arabic

The material included in the fourth and last part of this volume was subsumed together purely for linguistic considerations. The three chapters which compose this part are all written in Arabic. From the very beginning when the pre-publication seminar was still a vague idea, we were keen to have contributions in both English and Arabic; that is the reason why the Call-For-Papers and the Background Paper of the seminar were published in both English and Arabic. In order to facilitate the communication among the participants in the seminar, all papers were translated into English or Arabic and there was a simultaneous translation throughout the three days of the seminar. In our view, having contributions from different languages is much more than just linguistic diversity. Bilingual authors are well acquainted that writing in a specific language predominantly determines the content as well, e.g. which sources should be consulted, what kind of questions should be prioritized to address the concerns of the targeted audience, how these questions should be approached, ... etc. Consequently, we hope that the inclusion of this part will be of added value, especially for those who are curious about the Arabic writings on Islamic Bioethics.⁶ In order to make this material accessible to the readers who do not master the Arabic language, an English translation of the material included in this chapter will be available afterwards on the CILE website (www.cilecenter.org).

The first chapter, by Saadia Bendenia (Sa'diyya Bin Dunyā), “Al-Jīnūm wa al-ṭabī'a al-bashariyya: Muqāraba taḥlīliyya fī ḍaw' al-falsafa wa al-'ilm al-tajribī wa al-akhlāq al-Islāmiyya” (Genome and Human Nature: Analytical Approach in the Light of Philosophy, Experimental Sciences and Islamic Ethics) addresses the interplay of human nature and genome. The author starts her study by recognizing the complexity and elusiveness of the human nature and

6 It is to be noted that abovementioned CILE seminar included more Arabic contributions than those included in this chapter. Some of these contributions will compose a thematic issue in the Arabic journal *Tabayyun* (<https://tabayyun.dohainstitute.org>), to be published in 2019.

thus proposes an interdisciplinary approach to understand (certain aspects of) this nature. She emphasizes that the breathtaking advancements in fields like genetics and genomics, despite their significance, cannot alone explain what human nature is and that insights from other fields must be consulted. In this chapter, Bendenia tries to enrich her multidimensional analysis of the human nature through insights from different disciplines, including philosophy, biology (especially genetics and genomics) and Islamic ethics. Concerning philosophy, the chapter provides an extensive overview of perspectives, which spans many centuries of thinking about what the human nature exactly is. References are made to well-known philosophers like Socrates, Plato, Aristotle, René Descartes, John Locke, David Hume, Karl Marx, Sigmund Freud, Jürgen Habermas and others. As for the biological perspectives on human nature, Bendenia makes reference to influential names like Darwin, Gregor Mendel, Francis Crick, James Watson and also to the Human Genome Project. She explains how the big discoveries about the biological nature of humans led to the prominence of genetic determinism which was also countered by social determinism. Another consequence of these discoveries is that they opened up the possibility of understanding human nature as well as (re)shaping and modifying it. The last section of the chapter is dedicated to exploring human nature through the lens of Islamic ethics. According to Bendenia, human nature, from an Islamic ethical perspective, is a mixture of material (*mādda*) and soul (*rūh*) and that striking a good balance between the needs of these two aspects is the ideal way to remain healthy, in both the biological and moral sense. That is why the author believes that none of the two polarizing positions, viz. genetic determinism and social determinism, could capture the true character of human nature, which is actually a mix. The author interprets some Quranic verses, e.g. 25:54, in a way to support this idea. Using technologies like genomic editing in order to facilitate moral enhancement seems to be welcomed by the author because, she argues, it will generally improve human nature. Similarly, improving the material aspect of the human nature by making people taller or stronger does not seem to be problematic for the author. She bases herself on historical reports in the Qurʾān speaking about earlier generations of humans whose physical make-up was much stronger and bigger than ours. Thus, the author argues, the physical capacities that humans have now do not represent a fixed part of the human nature, but an evolving and improvable one.

The second chapter, by Abbas Ameir (ʿAbbās Amīr), is entitled “Suʾāl al-jinūm bayna al-khilqa wa al-akhlāq: Muqāraba dilāliyya maʿrifiyya fī akhlāqiyyāt ʿilm al-jinūm min manzūr Islāmī” (The Genome Question between physical make-up and ethics: A Semantic and Epistemological Approach to Genomic Ethics from an Islamic Perspective). The chapter investigates the links between par-

allel concepts like genotype and phenotype, and between *khilqa*, an Arabic word which means physical make-up, and *akhlāq* or *khuluq*, which means ethics or morality. The overall content of the chapter indicates that the author here touches upon the famous nature vs. nurture controversy. The main thesis of this chapter is that there is as a strong link between *khilqa* or one's physical, including molecular, structure and one's *khuluq* or ethics as the link between the genotype and phenotype. This means that any intervention in someone's molecular structure, e.g. through genomic editing, can have an impact on one's moral character. For Ameir, this does not necessarily mean that all types of genetic intervention are ethically objectionable, but that they should always be approached very cautiously. He distinguishes between a fixed part in our humanness that should never be touched, and a changeable part that can always be improved through human intervention. As an illustration, he refers to the freedom of human individuals to make choices about their own lives and the diversity of people's identities in life as components of the fixed part that should not be touched by the genomic editing or similar technologies. As a specialist in Quranic Studies, the author elaborates on this thesis throughout the chapter by depending heavily on references from the foundational Islamic Scripture, viz. the Qur'ān. He uses various hermeneutical and exegetical tools in interpreting about fifteen Quranic verses to show their possible relevance to the abovementioned thesis and associated ideas.

In the third chapter "Al-Jinūm wa al-ḥayāh: Tamdīd al-ḥayāh wa atharuh al-akhlāqī 'alā al-mujtama'āt al-Islāmiyya" (Genome and Life: Extending Lifespan and its Moral Impact on Muslim Societies), Amara Naceur ('Amāra al-Nāṣir) is somehow elaborating on the thesis outlined by Abbas Ameir in the previous chapter, but by focusing on one concrete example, namely modifying the genome for the sake of extending life and how far this would impact the world of ethics. According to the author, the attempts to postpone ageing and to have an extended life in principle do not go against human nature (*fiṭra*), as created by God. He makes use of prophetic traditions and references in the Qur'ān including historical reports about persons with extremely long lives, like Prophet Nūḥ (Noah), to argue that such attempts do not fall outside the borders of normalcy and natural course of life. On the other hand, the author argues that modifying one's genome for the sake of extending his/her lifespan poses complex ethical and philosophical questions related to our longstanding understanding of what "life" itself means. The social structure that people have in life, the author explains, and the associated values built throughout centuries are all linked to the average or "normal" lifespan that people used to live. Extending these "normal" lifespans will eventually mean that both the social structure of life and the associated values cannot continue without rad-

ical changes. Nāṣir makes use of the works of Western authors, like Francis Fukuyama, to show some of the concrete problems that can be created by extending the lifespan through biotechnological means, like the one described below.

The social structure of our current life largely depends on age-graded hierarchies, which usually assume a pyramidal structure. Besides artificial constraints such as fixing a (mandatory) retirement age, death remains one of the main factors which recede old generations from the pool of competitors for the top ranks in society. By extending the current lifespan to the extent that people will be expected to live and work until the age of 90 or even later, various generations will simultaneously exist and compete. Within this scenario, the elderly who are already at the top of the social hierarchies will not easily make space for the younger generations but will usually use their considerable influence to protect their positions, despite the likely declines in physical and professional capabilities because of age-related complications. This means that generational succession, which is a major stimulant of progress and change, will possibly be hindered. Eventually, we will have to think of other possible social structures, together with their fitting moral values (Fukuyama 2002, 76-79). Again, this shows that modifying the genome is not only a biological issue but a moral one as well.

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