

Genetics, Faith and Responsibility

I. Prologue

Genetic science includes a range of disciplines that deal with biologically based characteristics and their inheritance. The developments stemming from genetic science and its applications illustrate the abundant gifts of God's creation. Breakthrough discoveries and cutting-edge technologies evoke a sense of awe and provide insights into the human place within the web of creation. They unlock unprecedented power to diagnose and cure diseases and to address agricultural and environmental problems.

These developments also exemplify how contemporary human knowledge and technology are creating a different relationship between human power and life on this planet. Genetic science extends human powers over the fundamental processes of life in unprecedented and qualitatively different ways. It enables human beings to shape directly and rapidly the characteristics of living beings, including human beings.

The collective effects of these new powers mean human beings increasingly bear the moral burden for the shape of nature and the very existence of future generations. The cumulative force of such unparalleled power and choice promise great benefit but also present qualitatively new levels of danger and ambiguity.

The Evangelical Lutheran Church in America (ELCA) believes in one God, who created in the beginning, who creates now, and in whom all things, visible and invisible, hold together (Colossians 1:3–20). We confess that the Father, Son and Holy Spirit will redeem all that has been, is and will be—including human choices involving genetic knowledge and its application.

The ELCA believes that this gracious God also endows human beings with insight and reasoning, and calls human beings to help order and shape, nurture and promote the creation so that it may continue to flourish. This church recognizes that contemporary power, such as that arising from genetic science, presents human beings with choices and responsibilities for which human beings are accountable to God. This power obligates us to a greater level of accountability, one that will be measured best by whether and how the whole creation continues to flourish.

In its continued effort to discern God's will under the guidance of the Holy Spirit and in the light of the Holy Scriptures, the ELCA articulates basic convictions that should frame and guide thinking and action with respect to developments in genetics:

- Genetic science, its meaning and its applications, represent gifts intended by God to contribute to the human vocation to order and shape, nurture and invent.
 - o History demonstrates that human activity sometimes has been good for the health of creation while at other times it has damaged it.
 - o Genetic knowledge and its applications are not morally neutral. They require diligent and sustained attention in order both to direct their potential good and to limit potential harm.
 - o Individual and collective decisions must take into account the long-term impact of genetic science and technology as well as the character of the world today as a global village.
- The vocation of the human race includes God's call:
 - o to recognize and accept our distinctive power and freedom; and
 - o to take responsibility as innovative stewards who live out this gift and duty through various callings in daily life.
- The age-old human reality of sin, manifested as excessive pride and negligence or complacency, corrupts individual and social efforts.
- Contemporary power obligates human beings individually and collectively to assume a greater level of accountability for the future of society and the natural world.
 - o The moral imperative commensurate with contemporary human power is to respect and promote the community of life through the exercise of justice and wisdom.
 - o The sphere of moral consideration must encompass all of nature, not simply the immediate circle of human beings.
- Within these new complexities, God calls the church to renew the virtues and practices of *koinonia* (coy-no-knee-ah) or Christian community that emphasize spirited fellowship and unity in diversity.
 - o Renewed emphasis on such faithful practices will strengthen the church as a place of compassion and care, constructive deliberation and dialogue.
 - o New attention to Christian mutuality will support members in their various callings in daily life and in common efforts to take public action. It also will strengthen the church's witness to the need for respect, civility and dialogue in the civic realm.

- Earthly life is morally and spiritually ambiguous. Good and bad, right and wrong, sin and redemption are always mixed together.
 - o As redeemed and yet sinful people in Christ, we must speak and act boldly and yet in humility.
 - o Christian confidence to do so lies in the certainty of God’s promise to be present and ultimately to bring fulfillment to this good creation.

The ELCA contends that morally responsible **discernment** about these matters requires knowledge and insights from both religious and secular sources. This statement draws on both to provide a framework for theological reflection, public moral deliberation, congregational life, pastoral practice and mission-oriented action. It focuses attention on analysis, values, and convictions and not on specific issues. Such specific issues require detailed attention and may change quickly as genetic science and its applications open new frontiers and pose new questions.¹

II. Scientific and Social Contexts

2.1 Genetic science and technology

The ELCA values genetic science as an expression of the human responsibility to learn and predict, imagine and invent for the sake of stewarding creation. The discovery of the DNA double helix, the understanding of base pairs and codons, the capacity for recombinant DNA and the results of the Human Genome Project illustrate wondrous advances to celebrate.

This church recognizes and embraces the theoretical frameworks on which the science of genetics rests—frameworks informed by paleontology, biochemistry, molecular biology, embryology, physiology, anatomy and related fields of scientific endeavor. These frameworks enrich our appreciation of the human place in nature and the relationship of the human species to other parts of creation. They enable human beings to find new ways to promote the community of life.

The sciences, by definition, do not constitute understandings (or imply judgments) about God. There is no inherent conflict between scientific findings and the understanding of God as creator, redeemer and sanctifier. Christians should celebrate the best of theoretical and practical genetic science that explores genetic structure, function and change.

Technology, in its most fundamental sense, is “the use of knowledge through the mechanical arts and applied sciences to fulfill the human desire and disposition rationally to understand, order, predict, and (ultimately) control the events and workings of nature....”² While overlaps between the following categories exist, broadly speaking it is possible to distinguish six areas for the application (and consequences) of genetic knowledge at this time:

- *Molecular medicine*, including practices involving stem cell research and genetic therapy for humans and animals, personal genomics and the mapping of single nucleotide polymorphisms, and efforts to extend the longevity of human life to as much as three times today’s average.
- *Procreative activities*, including prenatal testing and screening, assisted reproductive technologies, preimplantation genetic diagnoses, and the artificial creation of new life forms (synthetic biology).
- *Genetic engineering in agriculture*, including practices such as genetically engineering seeds, cloning plants and animals, and “pharming.”
- *General commercial and legal applications*, including DNA testing for employment, health insurance, identification of victims after disasters or during criminal investigations, as well as matters of trade policies, and the patenting of genetic material and research processes.
- *Military use*, including biological weaponry and the DNA identification of battlefield casualties.
- *Social impact*, including discrimination based on genetic profiling, the practice of eugenics, and beliefs in genetic determinism.

Such a list illustrates why human beliefs and practices related to genetic knowledge bear both promise and peril. Genetic knowledge can create whole new industries that respond to the ailments and misfortunes of life. Yet, it also carries the potential for personal and social evil, such as discrimination or the dramatic alteration of species. It can aid agriculture, yet it also creates the potential for unforeseen consequences that cannot be easily reversed or minimized.

¹ As need arises, the ELCA authorizes the development of social messages and social policy resolutions to address specific issues. For more, see *Policies and Procedures of the Evangelical Lutheran Church in America for Addressing Social Concerns* (Chicago: ELCA, 1997, revised 2011), or visit www.elca.org/What-We-Believe/Social-Issues/Policies-and-Procedures.aspx.

² President’s Council on Bioethics, *Beyond Therapy: Biotechnology and the Pursuit of Happiness* (Washington, D.C.: October 2003), 2.

Genetic knowledge and technology pose new complexities and ambiguities. The benefits in the short term for one group or region may be harmful over the long term for a much larger group or area. The comforting information it provides for one individual may raise great fears for another. The use of genetic knowledge will reshape the future of the delicate web of life, while increasingly blurring the line between what is natural and what is artificial.

2.2 The global context

Scientific and technological developments, such as contemporary forms of communication, have created a global context that is relatively new in human history and vitally significant to any discussion of genetic knowledge and its application. Today's complex sets of natural, intellectual, economic and social dynamics are often depicted by the analogy of a "global village." This analogy suggests four realities:

a) The first is perhaps most commonly recognized: all societies on earth are ever more closely being interconnected. The availability of genetically modified products, for instance, affects not only what Americans eat, but also impacts the kind of seeds and farming practices available for African farmers. There are virtually no isolated choices or activities that affect only one area of the global village any longer. Political, economic, and social decisions today, as well as decisions about scientific research priorities and the application of scientific knowledge, move like ripples spreading across a small pond—their effects become visible everywhere.

b) Closely linked, the second aspect of the global village is the scope and speed at which changes are introduced. Even a hundred years ago, the results of decisions about agriculture and medicine, for instance, were confined to local regions and their effects spread gradually. The speed of developments today, however, is key to the change in the relationship between human power and the rest of nature. The scope and speed of change create legitimate concerns about the impact of those developments on human cultures and natural environments.

c) Knowledge and technology have never developed in a social vacuum, and genetic research and technology and their delivery are not socially neutral. Socio-economic factors influence what research is funded, how the results will be distributed and, in turn, who will benefit most. This means that the search for genetic knowledge itself, the decisions about what applications will be pursued and even social beliefs about their meaning must be considered in light of contemporary social factors.

The analogy of the "global village" points to the predicament of widespread inequalities across socio-economic level, country and region. Global and domestic inequalities serve to limit who is included in discussions and evaluations of genetic science and technology. These inequalities mean that all may not benefit equally or as rapidly (or at all) from genetic research and technology.

Many financially poor countries have immediate critical needs that do not require high technology solutions—needs such as infrastructure, effective food distribution, clean water, adequate housing and basic health care. Voices from within the Lutheran communion, as well as from foreign leaders and development experts, challenge Christians to advocate for investments that appropriately address these elemental needs. While there are no simple remedies in the global village to the problems of inequality and financially poor regions, these realities must be factored into contemporary dialogues about the just and wise use of genetic knowledge and its applications.

d) The final reality of the "global village" concerns the institutional power that shapes key decisions about what are socially beneficial areas of study, where to expend financial and human resources, and where to direct the attention of genetic science research and development. The interactions of many actors and forces influence the development of genetic science and its applications. Many key decisions, however, are formulated by a relatively small number of scientists, executives, managers and administrators in governments, industries and universities.³

Public dialogue and moral deliberation on questions of genetic research and its applications would be greatly enhanced if more people were included and empowered to participate. Broader public involvement is appropriate, especially because many genetic applications, like other technologies, have long-term social, economic and political ramifications.

Reasonable people may disagree about what levels of risk are appropriate and whether an outcome is beneficial. Institutional review boards, peer review panels, and other mechanisms of scientific oversight have been established to protect the rights of individuals and to enhance the common good.

The presence of these institutions, however, does not necessarily eliminate all instances of bias and fraud. They do not guarantee the fair distribution of risks and benefits. Publications in prominent scientific and medical journals indicate

³ See, for example, works by Lisa Sowle Cahill, *Theological Bioethics* (Washington, D.C.: Georgetown, 2005), 211–251; Marcia Angell, *The Truth about the Drug Companies* (New York: Random House, 2005), 91–92; Paul Farmer, *Pathologies of Power* (Berkeley: University of California, 2004).

that financial and other factors can lead some scientists and key decision-makers to lean toward specific interest groups or toward more narrow concerns than the common good.⁴

These four factors within the global village of human society shape the context in which individual and social responsibilities play out. It is a significant problem that such factors are frequently ignored in public policy discussions or are absent from assessments of genetic developments. The ELCA believes, in contrast, that these factors must be included in public dialogue weighing the benefits and challenges of the use of genetic knowledge and its applications.

2.3 The challenge

With many others, the ELCA understands that genetics can contribute to creative and beneficial care for the community of life. With others, we also are concerned about the potential harm. This harm may be the result of unintended consequences but it could be especially acute given the power of genetic science to alter existing life in direct, rapid and perhaps irreversible ways.

The ELCA's concern for benefit or harm, however, is not focused per se on any particular scientific or technological development. The concern, rather, focuses on the just and wise use of genetic knowledge and technology. For instance, the ELCA does not reject the use of genetic technology such as genetically modified organisms, prenatal diagnosis, or pharmacogenetics. Like other gifts of technology, there are reasons for both encouraging their use and for cautioning against certain means of applying them. This church believes the use of any technology should be subject to moral assessment.

The ELCA, through its members in their everyday lives and through its congregations, synods, churchwide expression, social ministry organizations and related institutions, is accountable for how it appraises and contributes to genetic science and its applications in this society. Toward that end, we turn to the resources of faith in order to discern insights and convictions that will guide this church's participation in society and its assessment of and engagement with changing circumstances and dilemmas.

III. Affirmations of Faith

3.1 Scripture and contemporary knowledge

Holy Scriptures are the authoritative source and norm of faith and practice for faithfully living out our relationship to God, to each other and to the rest of creation. Although the books of the Bible were written long before developments in modern science and technology put awesome powers in human hands, Scripture, as the guide for Christian discernment, illuminates contemporary challenges and issues.

Lutherans hold that God's word in Scripture acts upon human beings as law and gospel. The law presents insights for ordering a just society and it convicts of sin. It also points us to God's intentions and promises as a sure guide by which to orient and conduct our lives.⁵

The gospel proclaims the wondrous grace of God embodied in Jesus Christ to redeem and set us free to love God and to serve neighbors in love and justice (Luke 10:25–28). The insights and values, patterns and convictions of law and gospel play different roles in illuminating the context, issues and challenges posed by genetic knowledge and its applications.

The ELCA also believes that contemporary knowledge and insights can help Scripture speak in new and needed ways in today's context. They can help Christians interpret the Bible faithfully for both individual and corporate understanding.

The ELCA holds that Christian discernment and participation in public discussions concerning genetic knowledge and its potential benefits and harms will be inaccurate if we do not learn from the research of educational institutions and

⁴ See, for instance, H.T. Stelfox, G. Chua, G.K. O'Rourke, A.S. Detsky, "Conflict of Interest in the Debate over Calcium-Channel Antagonists," *New England Journal of Medicine* 338 (January 8, 1998): 101–106. This article indicates there is a strong association between reviewers' findings on the safety of a drug and the reviewers' financial relationships with the pharmaceutical industry. Other research provides evidence that scientific fraud may be connected to commercial ties. See both Brian C. Martinson, A. Lauren Crain, Melissa S. Anderson, and Raymond de Vries. 2009. "Institutions' Expectations for Researchers' Self-Funding, Federal Grant Holding, and Private Industry Involvement: Manifold Drivers of Self-Interest and Researcher Behavior." *Academic Medicine* 84 (11): 1491–1499 and Brian C. Martinson, Melissa S. Anderson, and Raymond de Vries. 2005. "Scientists behaving badly." *Nature* 435 (9): 737–738.

⁵ The Formula of Concord, Epitome, Article VI; in Robert Kolb and Timothy Wengert, eds. *The Book of Concord: The Confessions of the Evangelical Lutheran Church*. (Minneapolis: Augsburg Fortress, 2000), 502.

scientific enterprise or from the practice of medicine. It will be incomplete if we do not engage business and commerce, as well as social activists and those who care for the earth. On the other hand, the meaning of genetic knowledge and the debates about its use will be inadequately explored and morally dangerous without attention to the wisdom of faith traditions.⁶

To dialogues regarding genetic knowledge and its applications, this church brings the witness of Scripture, the knowledge of its members in their secular or “everyday” callings and Christian thought about the character of life and the good of society.

3.2 God: Creator of the community of life

Scripture and the Lutheran Confessions profess God the Creator who originates, preserves and will bring to completion the whole creation. Luther’s Small Catechism teaches about the ultimate dependence of the universe upon God’s creative activity in a simple yet profound way: “I believe that God has created me together with all that exists. God has given me and still preserves my body and soul.... And all this is done out of pure, fatherly, and divine goodness and mercy....”⁷

This divine parental-like action is not confined to a series of events in the past. God creates continually,⁸ orchestrating an interplay between the laws of nature and contingent events to create and sustain all that exists. Christians profess the Spirit of God, who moved over the waters at Creation (Genesis 1:2), as the creative wellspring of all life (Psalm 104:1–35). They understand the Word as the ordering principle of all that was, is and will be (John 1:1–18). God’s creative action brings forth a dynamic, varied, evolving, interdependent community of abundance and life. In this creation, each participant has a relationship to God and has a God-given integrity and value.

Genesis 1:1–3:24 illuminates these insights.⁹ God transforms the barren emptiness of the void into an environment of abundance that can sustain an elaborate, complex web of life. In so doing, God establishes a divine relationship of trusting community that constitutes a God-given goodness and dignity for the whole creation. Shaped by the gifts that God gives, there is both delight in and a task for each aspect of the creation.

Genesis portrays God creating the sun and moon with the task to rule (regulate and order) day and night. As with the seas, God commands the earth to bring forth and sustain living beings—wild and domestic animals, reptiles and other creatures that creep (Genesis 1:24–25). Each species of bird, mammal, reptile and insect has its own fertility and kind, ever dependent upon the land. All members of the community of life have the task to be fruitful, to multiply and to fill the earth. Because each participant of creation depends ultimately upon God and is tasked by God, they are not simply resources for human well-being or parts of a greater good; they are good in themselves.

As God transforms the earth from barrenness toward abundance, God chooses to make human creatures. These human creatures share some tasks of the sun and the moon (to regulate and order the earth) and some tasks of the earth and its creatures (to be fruitful, multiply and fill the earth).

God creates human beings as interdependent with the whole creation and as responsible to provide oversight as stewards who care for that creation. It is a vocation, a calling to continue what God is already doing for the earth—a calling to respect and promote the creation’s flourishing. In this sense, Genesis understands the human species as being created “in the image of God” (Genesis 1:26–28).

In Genesis 2:18–20, God brings every living creature to *ADAM*¹⁰ and watches to see what they are named. The text illustrates that human beings should be innovative and inventive as they help order, tend and shape nature so that barrenness might abate and abundance reign. Human beings are to be innovative stewards of creation.

This vocation within God’s creation means humans should not claim for themselves authority to make decisions based solely on human interests. They should consider both the integrity of the other participants in the community of life and their tasks before God. The human vocation as innovative stewards must be guided by the goal to respect and promote the earth’s abundance for the sake of the community of life.

⁶ The plural “traditions” recognizes that many faith traditions, not just Lutheran or Christian, have wisdom to bring to the table where these issues are discussed.

⁷ The Small Catechism, Kolb and Wengert, 354.

⁸ The traditional theological term for this point is *creatio continua*, a term taken from Latin meaning “continuing creation.”

⁹ In the early chapters of Genesis, scholars have identified the blending of two distinct narratives that both contribute to illuminating the origins of the creation and God’s relation to it. The first is found in Genesis 1:1–2:4a and the second in Genesis 2:4b–25.

¹⁰ The Hebrew word “ADAM” used in Genesis 2:7–21 means “earth creature.”

As one expression of human stewardship, this church affirms science and technology as appropriate means to order and imagine, nurture and invent. In this sense the ELCA rejoices in genetic knowledge and its application as an intellectual and social good.

3.3 Sin: pride and complacency

Genesis 1 narrates God's acts of creation from the perspective of God's powerful relation to all nature. The second narrative of origins (Genesis 2:4b–25) portrays the creation story primarily from the perspective of God's relation to human beings, where the alienation of sin soon enters the picture. It portrays the failure of human beings to live out their human vocation under God; it presents sin as disobedience rooted in lack of trust and faith in God.¹¹

Genesis 3:1ff. depicts human beings as attempting to usurp the place of God. The human creatures, against the Creator's directive and without seeking God's consent, eat the fruit of the tree of the knowledge of good and evil. Sin manifests here as excessive pride or self-assertion arising from misplaced trust in human knowledge, will and ability. This pride leads to the misuse of human power.

The multiple consequences of human disobedience are cataclysmic. Rather than receiving divine knowledge of good and evil, human beings practice dishonesty in self-deception and self-justification.

The cataclysm negatively affects the earth's thriving. The earth is depicted as having difficulty bringing forth plants, fruits and grain. Suffering, sweat and sorrow become part of the creation's broken situation. All creatures, including human ones, will return to dust (3:19).

The subsequent narratives in the book of Genesis depict this ongoing cataclysm as a pattern of broken relationships with God, within and between individuals, and in social organizations and structural arrangements. They demonstrate that sin's impact—serious enough on the level of the individual—can be magnified in collective beliefs systems, structures and institutions.

Genetic science and the delivery of its technology necessarily have a collective character. Like some other forms of technology, they require huge, continuous investments of human and financial resources. The potential for misuse of power has always been present in regard to any human technology. When human beings, however, gain significant power over the genome in global contexts, misuse carries qualitatively new dangers. Excessive pride can be especially tempting because genetic knowledge allows humans to push against previous constraints into ethically uncharted areas.

Along with sin as excessive pride, Scripture also teaches that sin can be manifested as negligence or complacency, a lack of trust in God that despairs in human failures and limitations and neglects responsibility for love and action (Matthew 25:14–30). This manifestation of sin can translate into resignation and fatalism.

Resignation can occur because genetic science, technology and commerce seem overwhelmingly complex and forbidding. It can follow and feed upon discouragement when individuals and systems are focused on self-interest and where commitment to care of the earth is tepid. Far too many become complacent or neglect their responsibility for the positive and constructive use of human powers. Far too many assume the role of a powerless bystander who believes little or nothing can be done to change the course of events.

This church recognizes that both manifestations of sin—excessive pride and complacency or negligence—can appear as humans seek genetic knowledge and use its potential. It believes both manifestations must be confronted.

The ELCA also raises a warning against genetic determinism and the association of the genetic code with original sin. Genetic determinism can appear in everyday beliefs or in various kinds of scientific research.¹² Genetic determinists may claim that gene expression is the explanation for original sin or the source of an inborn propensity to do evil.

Scientific disciplines contribute to human knowledge about the sources and dynamics of human behavior, but their investigations cannot exhaustively explain the Christian understanding of original sin as alienation from God. Regardless

¹¹ In Luther's discussion of the First Commandment in the Large Catechism, sin is identified fundamentally as trust and faith of the heart alone directed to false gods. Paul states: "for whatever does not proceed from faith is sin" as he seeks to persuade his readers that sin, grown from lack of trust in God, leads them to cause other believers to stumble, thus destroying the work of God (Romans 14:13–23).

¹² Such claims have appeared in the work of some researchers especially, for instance, in the disciplines of behavioral genetics, sociobiology and evolutionary psychology.

of the level of genetic influence on human behavior, the human race remains morally responsible and all people stand in need of God's grace for redemption.¹³

3.4 Redemption, hope and responsibility

Christians find redemption in God's self-revelation in Jesus Christ, crucified and raised from the dead (1 Corinthians 15:1–24). This revelation also orients Christian engagement with genetic knowledge and its application.

The Word became flesh, took on a human genome,¹⁴ and lived among the abundance and sorrow of the earth and human culture, as evident in Jesus' ministry of proclamation, healing and teaching. On the cross, God shows complete solidarity with creation, encompassing even its suffering and death, failures and sin (Psalm 22:1, Psalm 130:1). God turns the groans of creation (Romans 8:18–25) into a prayer out of the depths, taking human sorrow and sin into the divine life.

The horror of the Son of God hanging on a cross discloses the terrible consequences of sin that pervert even good intentions and structures. The cross stands in judgment of all human endeavors, intentions, social structures and technologies.

But sin and death do not prevail. The resurrection of Christ manifested God's power to create something out of nothing—to create life anew out of the negation of abandonment and death. In raising Jesus from the dead, God promises a future of restoration and abundance for the whole creation (Isaiah 25:6–9; 65:17; 66:22; Revelation 21:1–4). In this promised future, everything will be brought to judgment and redemption, including genetic knowledge and what humans make of it.

In baptism, Christians die to their sinful condition and take on the identity of Christ (Romans 5:12–21; 1 Corinthians 15:49; Colossians 1:15–16). They are baptized into Jesus' death and resurrection. Through the gift of faith, they receive God's power to live Jesus' way of service and care for others.

In the pattern of Christ, Christians receive a baptismal vocation¹⁵ to participate in God's ongoing work of sustaining and promoting life. They live this vocation out in everyday callings, such as those of citizens, parents or caregivers and in daily work such as that of scientists, medical providers or farmers. They find their overarching orientation in the vision and values of God's promised future for all creation. Their faith becomes ever active in love of others seeking justice.

The gift of faith does not end the reality of sin or overcome human finitude. The spiritual and moral ambiguity of life, even Christian life, requires commitment to critical engagement¹⁶ as one element of the vigilant rejection of their sinful condition. Present realities require difficult and complex decisions, often with uncertain and morally dissatisfying outcomes.

Living in hope of God's promised fulfillment and yet accountable for present actions, Christians are called to discern how God's gifts of genetic knowledge and technology may be wisely evaluated and responsibly used to serve the good of all. As a community of moral deliberation, this church is called to discern an ethical framework to engender moral formation, responsible deliberation and action in response to the challenges of unprecedented power.

Sharing a framework does not mean Christians will or must always agree about God's will. Moral consensus and certainty in daily life often elude the faithful.¹⁷ As members of the body of Christ, however, we struggle together to "discern what is the will of God—what is good and acceptable and perfect" (Romans 12:2). We are enjoined to abide in community and in dialogue.

¹³ Original sin refers to the human state of alienation from God. Some scientists assume or make express claims regarding genetic determinism. Other researchers and critics resist those claims and the dispute is a lively one. It is possible to recognize the explicit implications of some genetic sciences for inherited sin, the behavioral tendencies influenced by genetic code. The point here, though, is that claims about determinism must be resisted and that the understanding of original sin and human redemption are not determined by the results of scientific disputes. One illustration of attention to these matters may be found in Ted Peters, *Sin: Radical Evil in Soul & Society* (Grand Rapids Mich.: Eerdmans, 1994), chapter 10.

¹⁴ To take on human flesh is of necessity to take on a human genome as is emphasized in the begetting and conceiving language of Matthew 1:1–25; Luke 1:26–45; and John 1:1–18.

¹⁵ *Our Calling in Education* (Chicago: ELCA, 2005), 1.

¹⁶ Roger A. Willer, ed. *Genetic Testing and Screening: Critical Engagement at the Intersection of Faith and Science* (Minneapolis: Kirk House Publishers, 1998), 7–9.

¹⁷ *The Church in Society: A Lutheran Perspective* (Chicago: ELCA, 1991), 7.

IV. Respect and Promote the Community of Life with Justice and Wisdom

4.1 The imperative

Love of God and others is the guiding norm and imperative of Christian life. Following Martin Luther, the ELCA looks to Jesus' instruction about love in the Sermon on the Mount: "In everything do to others as you would have them do to you; for this is the law and the prophets"¹⁸ (Matthew 7:12; Luke 6:31). This biblical imperative demands moral reciprocity and mutuality, which people across the world have sensed and observed as a universal golden rule.

In the Lutheran tradition, Christians are freed in their baptismal vocation to follow this imperative through service to the neighbor and through building up of the common good. They are freed to reason with all people of good will and to seek shared moral understanding.

Following Luther and the Lutheran tradition, this church affirms that the meaning and scope of the golden rule are not static. The nature of reciprocity must be constantly reexamined in the light of lived circumstances. Contemporary knowledge and power call for the extension of the moral sphere beyond the human good. Moral standing does not belong to humans alone.

As reciprocity between humans does not always mean strict mutuality or equal treatment, so, too, reciprocity between humans and the community of life requires careful discrimination and judgment. Reciprocity must always mean that the community of life, its members and individuals, has moral standing that needs to be taken into account in discernment and deliberation for action.

Accordingly, responsible people are called to practice the imperative of love for all that God has made that today can be stated as: *Respect and promote the community of life with justice and wisdom.*

This ethical imperative¹⁹ provides a central value, basic directives and supporting principles as the means to evaluate policy and action. With this imperative, the ELCA articulates an ethic of universal human obligation to serve the flourishing of the created order.

4.2 Seek the good of the community of life

God's love, expressed in creation, redemption and promised fulfillment, nurtures and tends the community of life (Isaiah 43:16–21; 2 Corinthians 5:11–21). As God loves the world, so also humans should love the world. In imitation of God's love, the good of the community of life is the highest value, which human decisions, actions and relations should seek to respect and promote. For Lutheran Christians, seeking this good in all actions related to genetic science can be understood as an expression of our baptismal vocation to participate in God's ongoing work.

Western political thought has long centered on the common good of human society as the primary value for government and citizen action. Christian thought has shared this commitment, a commitment implied in the commands to love and do justice (Amos 5:24; Galatians 6:9–10).

Today, the meaning of "common good" or "good of all" must include the community of all living creatures. The meaning also should extend beyond the present to include consideration for the future of the web of life. The sphere of moral consideration is no longer limited to human beings alone.²⁰

¹⁸ Jesus provides a fuller summary of the "law and the prophets" that includes love of God in Mark 12:28–34, Matthew 22:34–40 and Luke 10:25–42. The double love commandment is formed by a blended and extended combination of Deuteronomy 6:4–5 and Leviticus 19:17–18.

¹⁹ For reflection on an imperative of this kind see William Schweiker, *Responsibility and Christian Ethics* (Cambridge: Cambridge University Press, 1999). See also Per Anderson's "Sufficient, Sustainable Lifespan for All: Responsible Biotechnology and ELCA Social Thought" in *Theological Foundations in an Age of Biological Intervention*, David C. Ratke, ed. (Minneapolis: Lutheran University Press, 2008).

²⁰ The theme of creation-centered stewardship developed in this statement builds upon the direction initiated by the 1993 ELCA social statement *Caring for Creation: Vision, Hope, and Justice*. Both reject the view (often termed "anthropocentrism") that the world was made for humans and that the rest of creation simply provides resources to serve human well-being. Anthropocentrism views non-human features of creation as lacking in moral standing. Drawing upon Scripture and ecological science, both statements understand humans to be essentially related to God's interdependent creation yet unique within it. Only humans can value other beings and systems beyond their own kind for their own sake as created and sustained by God. Since human beings have powers of agency that differentiate them from other life forms, they have unique responsibility to support the sustainability of all life on earth. While some thinkers today argue Christianity should adopt an ecocentric ethic that calls for egalitarian relations between humanity and otherkind, neither statement takes that approach.

The genetic sciences, as they investigate the structure and function of genes and chromosomes, teach anew about the integrity and interconnectedness of all life. All living beings exist because of common biological structures and processes, and all share fundamental dependencies and interdependencies. All life forms are related one to another.

New and growing knowledge about the fundamental genetic interconnectedness and basis of life reaffirms the insights of Genesis about the continuity of the human species with the rest of God's creation. Scripture and science bid all people of good will to consider and positively respond to the moral implications of human participation in the intricate web of life.

This participation and interconnectedness reveal that living beings and their future generations have a stake in human choices because their prospects, in some measure, will depend directly upon human actions taken today. In turn, the goods of human life (physical, psychological, reflective, social and spiritual) rest in significant measure upon the health of the ecosystem. The flourishing of our grandchildren's grandchildren depends on the health of this web of life, as well.

The good of the community of life should now serve as the overarching value to guide moral reflection and action. This church maintains that genetic knowledge and its possible application will most often be, and must always seek to be, of benefit to the community of life. It contends this value should rule against the use of genetic science that significantly injures the health of the community of life.

The pursuit of genetic knowledge and its applications will rightfully give priority to serving the needs of existing individuals and the human community, with particular attention to the needs of the most vulnerable. These efforts, however, must not compromise the integrity of future human generations and should consider the integrity of the rest of the biosphere—animals, plants, soils and the ecosystem as a whole, including the water and air on which it depends.

The goal and scope of the common good today includes the health of the community of life, today and tomorrow. To value properly this community, Christians and people of good will are called to take up dual roles. As members of the community of life, we must cultivate and act out of respect for the rest of the community. Aware of our connection to other living creatures, we also must assume new responsibilities for creatively intervening as stewards of the good creation.

4.3 Respect

Respect is a directive grounded in the dignity and integrity of created life (Exodus 20:11–17). For Lutheran Christians, respect follows from God's regard for all life as precious, from the amoeba to the person. Human beings cannot love as God loves, but the minimal response of innovative stewards to other members of the community of life is to recognize their givenness²¹ and to perceive their inherent or intrinsic value.

The fact that creatures across the multitude of forms exhibit both purposiveness²² and interdependence establishes the grounds for respect. The community of life is sustained by individual activity and mutual interdependence as all creatures function together within a complex whole.

Respect constitutes a moral baseline that places limits on all relationships, decisions and actions. The placement of the directive to respect before the directive to promote indicates a priority for claims of integrity and dignity for members of the web of life.

This priority is consistent with the Lutheran understanding of the use of the law to protect from harm and restrain evil.²³ It expresses the biblical recognition of the power of sin and self-deception evident even in the desire to seek the good (Romans 7:14–23).

While respect means Christians should practice regard for others in all their relations and actions, it does not mean that the interests of life forms do not conflict. Everywhere on earth, life feeds on life. It does not mean Christians can

²¹ "Givenness" here refers to how others are "given" to us as beings in themselves, as they are according to their received nature and agency. This givenness does not mean nature is static or unmalleable but does establish that members of nature possess an integrity because of the "way things are."

²² It is widely accepted in the philosophy of science that nature does not exhibit an inherent teleology or purpose. Living creatures, however, do express purposive effort on their own behalf in the sense of seeking nourishment, reacting to their environment, and reproducing. For more on how this purposive effort establishes a basis for respect, see Hans Jonas, *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* (Chicago: University of Chicago Press, 1985), chapter 3.

²³ It also is evident in Luther's explication of the Commandments in the Small Catechism, which presents the negative prohibition of each commandment first. The positive purpose is given second. The Small Catechism, Kolb and Wengert, *Book of Concord*, 352–354.

or must show equal regard for the amoeba and the person. When the interests of life forms conflict, Christians must discern morally relevant differences and seek to resolve these dilemmas in ways that respect all.

Christian faith views all life as precious and given, such that respect and gratitude must govern even the sacrifice of life in which humans are inevitably involved, such as eating or aspects of scientific research. The fecundity of the web of life calls forth awe and wonder as well as loss and mourning. Respect for life engenders both responses.

Respect requires significant constraints upon human action toward other human beings, even for the sake of helping or benefiting them. For example, in the context of medical care, people are entitled, as an expression of their dignity, to informed consent that limits or constrains what medical staff properly can do.

In the domains of genetic research and application, whether upon plants, animals or humans, respect must continually guide and sometimes control human action. This is true even with actions that seek to enhance or improve the community of life. Given the complexity of the community, with the interwoven and sometimes conflicting interests of its members, discerning what it means to respect life can be difficult.

Conflicting interests cannot always be reconciled. The dignity of all life, however, calls for discernment of appropriate expressions of regard for others, which will vary across forms of life. For example, genetic research on competent human subjects should never be undertaken without informed consent. For non-competent human subjects, respect requires more than surrogate informed consent and it may allow research only under conditions that limit risk and maximize benefit.

Genetic research on animals, such as mice, may require the death of individual experimental subjects. The directive of respect, however, rules out frivolous or abusive treatment.

Genetic research on plants and animals should consider also what it means to respect a species in relation to the health and integrity of the biotic community. Species come into existence, change continually, and sometimes go extinct due to natural and human causes. The flourishing of life, however, depends upon complex capacities to deal with stress, to reproduce, and to maintain optimum operations such as biodiversity. When genetic science and technology intervene into the integrity of a plant or animal species, the wider web of life must be respected and regarded as morally relevant.²⁴

Members of this church will not always agree about what it means to respect an individual life form, a species or the biotic community. An ethic of responsibility requires this church to be in dialogue about how the directive of respect governs the many different domains of genetic science and its applications.

While the discernment of respectful action can sometimes be difficult and elusive, respect plays a vital protective role. This role is critical in social contexts marked by an aggressive resistance to human suffering and death. It is critical in a century of burgeoning powers where the integrity of life can be compromised by the desire to make the world a better place. Respect challenges the temptation to achieve all the perceived “good” possible regardless of means.

This church believes all technologies deserve moral scrutiny because they bear on individual and corporate practices and the matter of respect for others. It rejects ideological positions that portray scientific breakthroughs and new technologies as inherently valuable, progressive, inevitable and irreversible.²⁵

This church also rejects the tendency to cede moral deliberation to those whose primary interest is determining what kinds and levels of technology economic markets will bear. Self-interested pursuits in an economic marketplace cannot serve as a substitute for direct and explicit respect for the needs of participants in the community of life.

As respect governs human relationships within the community of life today, it must also guide actions toward future members. For example, human reproductive cloning might be possible given the development of mammalian cloning (1996). As a matter of respect, however, the ELCA affirms the widely held rejection of research into human reproductive cloning because of the unacceptable risk of harm to experimental subjects.

This church will continue to reject human reproductive cloning as a matter of respect even if it becomes safe and economically feasible. A person should not be treated as a means to another person’s end. Cloning for the sake of repeating another individual’s genotype violates this standard. Aims other than the replication of identity may be possible, but they are not compelling today.

If individuals are cloned despite societal and ELCA rejection, this church will respect their God-given dignity and will welcome them to the baptismal font, like any other child of God.

²⁴ The inclusion of the community of life within the scope and scale of Christian love of others has been made for some time now. See, for example, James Nash, *Loving Nature: Ecological Integrity and Christian Responsibility* (Nashville: Abingdon Press, 1991). See also references in footnote number 19.

²⁵ These ideological positions are often referred to as “technological determinism,” the “technological imperative” and “market fundamentalism.”

4.4 Promote

Promote is the other essential directive of the human vocation to be innovative stewards. This directive is grounded in the character of God's creative action, expressed in both the dynamic character of nature and the multiple gifts bestowed upon the human species. Human beings cannot create as God does, but they are to be imaginative, inventive and responsible caretakers (Psalm 115:16).

The minimal response to being a human part of the web of life is to: (1) use our capacities for imagination and innovation to promote the well-being of the community, and (2) to resist the temptations to negligence or complacency. Christians find their motivation to benefit others in Jesus' example. In him God's love confronted the ailments and misfortunes of other people in ways that lessened or cured them (Luke 10: 26-37).

Within the limits of respect, the golden rule today bids humans to promote the benefit and betterment of the community of life through creative intervention into its givenness. Genetic knowledge and technology offer stunning means to advance such efforts. The directive to promote the community of life today can include the enhancement of life processes and traits that are passed to future generations, such as developing domestic seeds or animals with improved nutritional qualities.

God's intention for the fulfillment of creation will not be realized by human efforts to intervene in its processes, and God's redemption will not come through genetics. Human efforts to promote the flourishing of the community of life through genetic innovation, however, can contribute to the good of the whole community. Such efforts also can be reminders, albeit fragmentary ones, of creativity and goodness that witness in history to the ultimate victory of God that is to come.

The priority of respect over that of promotion means that not every possible enhancement or innovation should be pursued. Promotion must not violate the fundamental directive of respect. Efforts toward enhancement or innovation must be evaluated also through the norms of justice and wisdom. This church rejects striving after some imagined perfection or idealized state of human life.

Qualified by these limits, the ELCA encourages human imagination and innovation in the use of genetic knowledge to address physical and mental conditions, relieve human suffering and improve the human situation. It supports efforts to benefit general well-being within the rest of nature and the use of creative means to restore the environment that humans have destroyed or damaged. It supports investment in such goals.²⁶

4.5 Justice

Christians join with others who serve the call to "let justice roll down like waters, and righteousness like an everflowing stream" (Amos 5:24). It is clear that justice is God's intention for all relationships and that it means "honoring the integrity of creation, and striving for fairness within the human family."²⁷

Urged on by that vision, this church teaches that God holds governments accountable to ensure justice. It also holds that every organization, business, profession and citizen has the common responsibility to pursue just arrangements in the exercise of social power and the making of economic decisions.

The uses of genetic knowledge occur within a network of relationships. Such uses depend upon social and natural resources, and rightfully are subject to concerns about a just society and care of the earth.

Previous ELCA social statements have identified four guiding principles that spell out the meaning of justice relevant to the study of genetics and its use: sufficiency, sustainability, solidarity and participation.²⁸ These principles articulate essential criteria for discernment and deliberation in the quest to use genetic knowledge for good while avoiding harm.

These principles, taken together, attend to the temporality and interdependence of the community of life and are critically necessary to guide moral decision-making in this century. The principle of sufficiency guides decisions in the present while sustainability protects the future. Together they express moral concern for consequences across time.

The principle of solidarity entails compassion and accountability for the interdependence of life. The principle of participation insists all living things be considered in calculations about the good of the community of life.

²⁶ *Caring for Health: Our Shared Endeavor* (Chicago: ELCA, 2003), 17.

²⁷ *Caring for Creation: Vision, Hope, and Justice* (Chicago: ELCA, 1993), 6.

²⁸ The ELCA has 10 social statements. The themes developed here appear in several of these, but the fullest use is found in the statements *Caring for Creation: Vision, Hope, and Justice*, 1993; *Sufficient, Sustainable Livelihood for All*, 1999; and *Caring for Health: Our Common Calling*, 2003. More information is available at www.elca.org/socialstatements.

Sufficiency

The principle of sufficiency obligates human beings to care for the basic needs of others and all other life forms. It is grounded in the belief that God provides abundance that is sufficient for all. The ELCA has taken the position that economic activities must be evaluated in terms of how they “enable people to meet their basic needs, including nutrition...health care, personal development, and participation in community with dignity.”²⁹

Genetic science and technology require an immense investment of human and economic resources. Accordingly, economic activity resulting from genetic knowledge and application should explicitly align with serving the basic needs of human beings and the natural environment.

Since agricultural biotechnology and many aspects of medical genetics directly concern the basic needs of human life, sufficiency reinforces the ELCA’s position that decisions about these goods cannot simply be left to the mechanisms of the market.³⁰ This church defines the public good in terms of sufficiency and contends that genetic research, medicine, commerce and biotechnology should advance the common good rather than the economic gain of some.

The ELCA has called for scrutiny concerning “how specific policies and practices affect people and nations that are the poorest.”³¹ Such scrutiny involves, for instance, assessing whether corporate ownership of seed patents increases the availability and equitable distribution of food for people who are hungry in the short-term while increasing the ability of people to feed themselves in the long-term. This church encourages governments, universities, nongovernmental organizations, and private companies to seek ways to contribute to meeting basic needs and to broaden access for all who might benefit from genetic applications.

Sustainability³²

ELCA statements have described the principle of sustainability as “providing an acceptable quality of life for present generations without compromising that of future generations.”³³ In the past, Christians have supported this principle by appeal to the sabbath and jubilee laws (Leviticus 25:1ff.). Today, responsible people must embrace a larger scope of accountability to future generations because of increases in both human power and population.

The ELCA has affirmed research and application that protects and promotes the capacity of natural and social systems to survive and thrive together over the long-term. It also has encouraged respect for reasonable environmental limits.³⁴

This church has long supported judicious government regulation to protect the needs and rights of individuals and communities and to promote the common good.³⁵ It has considered social, economic and environmental impacts to be legitimate criteria for consideration when developing national regulatory and product approval processes. It affirms the work of regulatory science, risk assessment and risk management, and impact assessment. Such work should be aimed at fostering policies and practices consistent with long-term sustainability.

This church, however, believes overly restrictive regulation must not be a default response to novel genetic technology. Regulation must be justified by specified concerns for the potential harm of a genetic application and its delivery or by the necessity to regulate toward equal access and use.

In regulating new products and processes, government regulators and policy makers have historically relied on three standard criteria: (1) human risk and safety, (2) immediate animal and environmental risk and safety, and (3) technological efficacy. The ELCA affirms these criteria and urges their continued, consistent and reasonable application.

²⁹ *Sufficient, Sustainable Livelihood for All* (Chicago: ELCA, 1999), 10.

³⁰ *Ibid.*, 4.

³¹ *Ibid.*

³² There are many and varied definitions of sustainable. It is used here as a general principle of justice, not a particular set of practices. Many national governments and international governing bodies have sought to codify the concepts of sustainable resource use, sustainable development and sustainable agriculture. “Sustainable” here is *not* tied to any specific definition although many of them may contribute to a general sense of the term.

³³ *Caring for Creation: Vision, Hope, and Justice*, 7.

³⁴ *Ibid.*, 8.

³⁵ *Sufficient, Sustainable Livelihood for All*, 10.

In the assessment of genetic processes and products, however, the ELCA calls for the implementation of an additional criterion: *long-term, ecological, social and economic impact*.³⁶ The implementation of this criterion would introduce novel features into the current regulatory process and could slow development. Its inclusion in models of risk assessment and regulation, therefore, must be judicious. Its inclusion, though, is vital because the application of genetic knowledge may have extraordinary impact on the biosphere and future generations. Its inclusion can help guard against extraordinary unanticipated and unintended consequences on species (including on the human species).

This church recognizes that development of protocols for assessing long-term, ecological, social and economic impact requires creating new and effective models to implement such assessment. It will be a notable challenge to develop these models in the face of conflicting interests. The ELCA calls upon its laity with appropriate expertise to be involved in such efforts as a part of their callings.

Solidarity

Solidarity recognizes a kinship within all of nature that issues from God's creative activity (Psalms 104 and 148). It recognizes the fundamental human continuity and interdependence with all living things and natural resources on the earth. It expresses the contention that the interests of the entire community of life should be legitimate concerns when decisions are made and actions evaluated.

The principle of solidarity grounds the moral duty of human beings to stand together in interdependence to act locally and globally on behalf of individuals and cultures.³⁷ It provides a check on the tendency of human endeavor to benefit primarily those who hold power or privilege at the expense of those who have little or no power.

This principle raises the question of benefit. It asks how research priorities are decided and registers concern about where time, dollars and expertise are invested. It calls for weighing the needs and desires of relatively affluent populations over against the most pressing needs in resource-poor nations. It affirms a commitment to taking into account the needs of those who are marginalized by socio-economic class, limited political power, race, gender, sexual orientation and various disabilities.

Solidarity encourages the search for ways to direct genetic research with an eye toward whether or not the procedures and technologies will become widely available. Solidarity stresses that those who set research priorities should keep these concerns in view, especially when research focuses on diseases or situations that affect relatively few numbers of people or when they address problems found especially among the more affluent.

This principle also bears on the way research is done. For instance, public and private sector research organizations have different institutional incentives and produce different types of knowledge and technology. Historically speaking:

- universities conduct research directed at the creation of public goods;
- industry conducts research directed at the creation of proprietary goods; and
- government provides funding for research and regulation for fair competition and public safety.

This arrangement has delivered products enhancing social welfare. Short-term gain or greed and bias, however, can cloud long-term vision. This problem can be especially acute when profitability is the determining factor. Scientists in a private research organization may have different motivations and goals from those in public research organizations. These differences can be especially significant with regard to what illnesses are researched, therapies developed, seeds marketed and the kinds of animals cloned.

A balance of proprietary and public goods is necessary to enhance social welfare. It is important, then, that the society of the United States maintain robust public funding for genetic research and development. From the vantage point of solidarity, it is a worrisome trend when universities limit or withhold public access to their work for proprietary reasons such as patent rights and increased revenue streams.³⁸

The ELCA encourages the establishment of policies ensuring that intellectual property protections do not limit research or the development of new discoveries that might contribute to the social welfare. In its advocacy work, this

³⁶ For example, see William B. Lacy, "Agricultural Biotechnology, Socioeconomic Issues, and the Fourth Criterion." in *Encyclopedia of Ethical, Legal, and Policy Issues in Biotechnology*, Thomas H. Murray and Maxwell J. Mehlman, eds. (New York: John Wiley & Sons, Inc., 2000), 77–89.

³⁷ *Sufficient, Sustainable Livelihood for All*, 4f.

³⁸ For more on this see Richard C. Atkinson, Roger N. Beachy, Gordon Conway, France A. Cordova, Mary Anne Fox, Karen A. Holbrook, Daniel F. Klessig, Richard L. McCormick, Peter M. McPherson, Hunter R. Rawlings III, Rip Rapson, Larry N. Vanderhoef, John D. Wiley, and Charles E. Young. 2003. Public Sector Collaboration for Agricultural IP Management. *Science* 301(July 11): 174–175. Gregory Graff and David Zilberman. 2001. An intellectual property clearinghouse for agricultural biotechnology. *Nature Biotechnology* 19: 1179–1180.

church must raise questions about whether for-profit genetic science and technology serve the common good and whether states and nations allocate sufficient public funding to meet the obligations of justice.

The ELCA calls upon those in government and commerce to give emphasis to seeking the means to direct equitably the benefits of genetic knowledge and application. It urges attention to achieving access for all members of the human family regardless of which segments of society a person can be identified with.

Participation

The principle of participation recognizes that God’s creative activity invites the involvement of all creatures in the continuation and flourishing of the community of life. It calls for human action to do the same. This principle grounds the idea that human beings “are to participate actively in decisions that impact [their] lives.”³⁹ This church maintains that marginalized voices must be given particular opportunities for participation.

Participation guides the ELCA insofar as it seeks to be a community of moral deliberation. It also authorizes this church’s advocacy—speaking alongside and for those who are marginalized. Advocacy occurs as members speak out individually or as part of activist groups. It also includes the public witness coordinated by the advocacy offices of the ELCA or of Lutheran partner nongovernmental organizations.

As a principle of justice in the contemporary context, participation requires that all living things be respected as “entitled to be heard and to have their interests considered when decisions are made” or when actions or policies are evaluated. Human deliberation should “hear” the needs of all living things—present and future—with special regard given to the voices of those who work closest to the land and with living creatures.⁴⁰

The principle of participation supports this church’s conviction that genetic research and its application require public accountability. Such accountability is especially relevant when novel products and procedures are being developed.

In those cases, the ELCA encourages that requisite time be taken for research, education and monitoring that allow large portions of the public to understand the issues and their ramifications. If the interests of marginalized people are at stake, it is necessary that means be found to offer these individuals and groups the practical means to register their concerns.

This church encourages its members and all people of good will to be aware of, seek sound knowledge of, and actively participate in, debates concerning public policies related to the application of genetic knowledge. It calls upon government and businesses to ensure that procedures and sufficient time provide the means for broad participation.

4.6 Wisdom

In a century of growing genetic knowledge and practical power, the golden rule demands wise use of that knowledge and power. Wise use requires expert knowledge as well as humility and caution in the face of conflicting demands and uncertainty.

Knowledge of experts

The ELCA believes all people must seek and use the best knowledge available in making decisions and developing practices or protocols. New scientific discoveries and technologies often raise moral questions that cannot be addressed without complex knowledge. In these situations, good character and “common sense” alone may not provide sufficient information or insight to determine the most adequate course. This requires seeking out the knowledge and insight of specialists and experts. It also requires learning how to critically assess and employ their input.

Knowledge matters to moral insight. Those who possess special or expert knowledge relevant to decision-making have a moral duty to share what they know with those engaged in the process of moral discernment and policy adoption.

At the same time the specialist has a responsibility to exercise humility about the range and durability of what specialists believe they know. Their responsibility also includes enabling the participation of others in the process of moral discernment and policy adoption.

Humility

Martin Luther and the Lutheran tradition have encouraged the cultivation of humility to restrain sinful thought and action. The moral ambiguity of modern science and technology points to the continuing importance of this virtue. The unknowns, the conflicts and other challenges of moral discernment about genetics, even with the benefit of the best knowledge and sound principles, warrant the continued cultivation of personal and communal humility.

³⁹ *Sufficient, Sustainable Livelihood for All*, 9.

⁴⁰ *Caring for Creation: Vision, Hope, and Justice*, 6.

In the case of genetic research and application, well-intentioned people can disagree over matters of knowledge and how to respond to the state of knowledge. Discernment may be further complicated by the question of what criteria should be given priority when evaluating promise or harm. In some cases, the principles of sufficiency, sustainability, solidarity and participation will be in conflict.

Reasonable people, for instance, may observe that an existing technology with known risks will adequately solve a problem in question and that a genetic technology is not necessary. Others may claim that present technology is insufficient to solve the problems or will create unacceptable consequences in the long run. Such differences in judgment may stem from questions of knowledge, and parties to these disagreements will bring different forms of knowledge, each of which may be needed for adequate deliberation.

In the face of differing analysis, conflicting principles and contrasting knowledge claims, wise moral reasoning invokes the virtue of humility. It practices this virtue in listening to others with good will and in remaining open as others express their positions and interests.

Precautionary principle

The importance of humility in the face of uncertain knowledge leads to a principle of wisdom: the precautionary principle. The ELCA understands this principle to mean “When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, action shall be taken to avoid or diminish that harm.”⁴¹

This principle covers only a limited class of risk-taking actions—but an exceedingly important one.⁴² In response to certain conditions, this principle embodies caution grounded in respect for the community of life. It does not apply where standard risk-benefit analysis can be used and present or future outcomes can be predicted and evaluated reliably.

Precaution comes into play when existing tools for risk assessment are overwhelmed by a high level of uncertainty and proposed actions may dramatically affect the integrity and limits of the earth or the existence of future generations. In such cases, the burden to demonstrate safety rests upon those who promote the novel action.

Given the directive to promote the community of life, precaution does not intend to stifle exploration, innovation or new technology. This church encourages these, but calls for wise care and restraint in response to extraordinary uncertainty, speed and potential harm due to technological innovation. As common human wisdom maintains, responsible people should, above all, do no harm in seeking to benefit others.

4.7 General convictions

The imperative to respect and promote the community of life with justice and wisdom provides a general orientation for the human vocation today. As a framework for faith active in love of others, it provides for respectful deliberation, creative choices, sound advocacy, wise practices and life-giving decisions over the long haul. This framework leads this church to state some general convictions that can guide particular judgments about the use of genetic technology and contribute to the common good of all.

The ELCA calls upon individuals, agencies, organizations, corporations and governments *to pursue goals and set policies or establish practices that:*

- advocate for genetic research and discovery that advance the good of the present generation and those to come;
- affirm the good of genetic technologies and economic enterprises that enable the community of life to flourish;
- encourage varieties of research aimed at improving human health and well-being;
- give priority to global health issues and needs, particularly those which may benefit by genetic research even when the economic return is small;
- maximize the use of medical genetic information to improve care without succumbing to discrimination or the abuse of privacy;

⁴¹ Since there are varied meanings for the term “precautionary principle,” it is important to stress that the definition given here is supported by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Greater detail can be found in the volume: *United Nations Educational, Scientific and Cultural Organization World Commission on the Ethics of Scientific Knowledge and Technology, The Precautionary Principle* (Paris: March 2005), 16.

⁴² *Ibid.* This volume states: “The [precautionary principle] applies to a special class of problems that is characterized by: (1) complexity in the natural and social systems that govern the causal relationships between human activities and their consequences, and (2) unquantifiable scientific uncertainty in the characterization and assessment of hazards and risks. The existing decision-support tools to cope with risks in a rational way, such as probabilistic risk assessment and cost-benefit analysis, have limited value under these conditions.”

- affirm quality of human life improvement with reasonable life extension without expecting or seeking perfection, insofar as such research does not lead to unjust and disproportionately biased use of limited human and financial resources;
- encourage the development of genetic means to aid reversal of past human abuse of the environment without harming the future;
- promote greater dialogue, understanding and cooperation among organic and conventional farmers to solve production issues and lessen tensions;
- implement long-term, ecological, social and economic impact assessment in regulatory protocols around genetic research; and
- encourage the development of means to enable marginalized voices to be heard in public policy debates.

Likewise, this church *rejects beliefs, goals and policies that:*

- rely upon or encourage fatalism and genetic determinism;
- use genetic knowledge or technology to create unsustainable practices or supposed states of perfection;
- use genetic information for discrimination in employment, health care or insurance coverage;
- use personal genetic information without consent;
- expand genetic research or technology that endangers human bodies for the sake of economic gain or social power, which is a particular danger for marginalized racial and ethnic communities; and
- practice institutional or ideological human eugenic programs.

Likewise, the ELCA *will raise searching questions about goals and policies that:*

- expand genetic research or technology while knowingly and unduly endangering plant and animal species, microflora or fauna, or the existence of biodiversity;
- impact negatively on individual and community livelihoods and that impede or harm cooperation and respect among affected people and communities; and
- direct genetic knowledge and technology in ways that further inequalities or benefit the interests of the few at the expense of the many.

As a community in Christ engaged in moral discernment regarding issues of research priorities and the just delivery of the products of research, and as a participant in public dialogue regarding genetic knowledge and its uses, this church will consistently articulate, argue for and apply such convictions as expressions of an ethics of reciprocity and responsibility.

V. Challenges and Commitments for Christian Community

5.1 Changing contexts

In much wisdom is both vexation and satisfaction, and those who increase knowledge increase both sorrow and possibility (Ecclesiastes 1:12–18). The ELCA recognizes that the 21st century seems certain to bring a tremendous increase in what rightly may be called ambiguous promise.

Opportunities afforded by the advance of genetics have brought or hold promise for new and exciting solutions to old problems. They also will bring greater complexity and ambiguity into the decisions that have to be made in the pastor’s study, doctor’s offices, boardrooms and public policy debates. Sometimes the answers will seem straightforward to some while not to others, and sometimes the personal decisions that must be made will be heart wrenching. The cumulative effect will introduce greater diversity into congregational life.

In the midst of ambiguous promise and greater diversity, the ELCA, thankfully, can call upon resources of the Christian faith with renewed emphasis and can take up long-standing responsibilities shaped in new ways.

5.2 *Koinonia*

The New Testament Greek word *koinonia* (coy-no-knee-ah) carries multiple and layered meanings evoking “community,” “mutuality,” “fellowship,” “reciprocity,” “holding in common,” and “union.”⁴³ The term embraces all of these meanings to suggest a spirited commitment to bearing one another’s burdens and being one in Christ. The renewal of *koinonia* is vital for Christian identity today.

⁴³ The following is a sample of the New Testament texts referring to the noun *koinonia* and its verbal parallels. Acts 2:43–47; Romans 15:25–29; 2 Corinthians 8:1–14; 9:1–15; Galatians 2:6–10 (“the right hand of fellowship”); Philippians 1:1–11; 2:1–11; 3:1–11; 4:10–19. See *Theological Dictionary of the New Testament*, Vol. 3, Gerhard Kittel, ed., Geoffrey Bromiley, tr. (Ann Arbor, Mich.: Eerdmans, 1968), 789–809.

Koinonia has its origin in the life of the Triune God; it refers to the relationship of love and mutuality between the Father, Son and Holy Spirit. God's love is the basis, model, source and motivation for Christians dwelling together in this way (John 13:31–35). As a vital dimension of Christian identity, it is a gift of the Holy Spirit. It is also a calling to cultivate Christian virtues and practices.

The increasing complexity and diversity of options, decisions and points of view represent a key challenge to Christian community in this age of genetic knowledge. Christian community is an identity to be lived into, one that offers the basis for listening, speaking and being together as Christians. It is one that embraces the difficulties and joys as well as the ambiguities brought about in a time of immense new powers.

As places of *koinonia*, congregations and other ministry sites today are called to live into an identity in which all suffer in common when one suffers and all rejoice when one rejoices (1 Corinthians 12:1–26; Romans 12:15; Philippians 2:1–4). For instance, the knowledge that there is a genetic source for an ailment or a new genetic intervention for a given diagnosis will bring relief and joy for some people. For others this knowledge or a failed human intervention may well bring greater anguish and a sense of futility. Some individuals will be able to take advantage of genetic advances and others will not. Some will choose not to do so. In each case, as communities of Christ, congregations are called to be places of compassion.

Genetic factors play a significant role in chronic physical conditions, mental illnesses and cognitive limitations. Certain genetic mutations contribute positively to healing or aging while others are associated with disabilities, chronic medical problems and shortened life spans.

As places of *koinonia*, this church urges its congregations, campus ministries and other ministry sites to welcome all. This welcome includes seeking ways to enable all people both to participate in their ministry and mission⁴⁴ and to receive competent and caring pastoral care appropriate to their situation. This commitment to welcome, to participation and to appropriate pastoral care will be important especially if genetic interventions were possible but decisions were made to forego them.

Congregations and other ministry sites also are called to practice *koinonia* in encouraging respect between brothers or sisters in Christ who disagree sharply (Romans 12:9–21). It must be recognized that the choices of Christian people regarding genetic applications sometimes will disrupt the assumption of shared viewpoints and common values within congregations and places of ministry. Respect for others when there are sharp differences can be especially challenging.

Christian community today does not mean benign tolerance. It invites common discernment in respectful wrestling with and, sometimes, constructive challenge of each other's beliefs and viewpoints. In increasingly complicated and complex situations, congregations and ministry sites today will recognize that the will of God may not be absolutely clear, even while it is absolutely clear that the will of God must be sought (Romans 12:1–2).

In these times, congregations and other sites of ministry will need to give renewed attention to becoming lively places of common reflection, deliberation and discernment. Given the highly polarized character of contemporary society, they must be, above all, places of constructive and civil dialogue. Christian life together will mean careful discernment about when challenge or action is needed and when acceptance or accompaniment is called for.

Koinonia is an ancient dimension of life in Christ that has new implications today. It calls forth shared practices and discernment, even if conclusions are not always shared. It nurtures members both in sharing joys and in coping with suffering and sorrow. It evokes re-imagining the future together when sorrows and anxiety cannot be removed. It forms lives for service and responsible choices in times of amazing possibilities.

5.3 Leadership

The Lutheran tradition has a long history of preparing leaders who are learned in the general education of sciences and the humanities. Leadership in a time when genetic developments promise immense changes and challenges makes this education ever more crucial. In addition to immersion in the humanities, the ELCA urges its leaders and encourages its members to seek a working knowledge of the natural world through the physical sciences and to seek knowledge of the forces that shape society through the social sciences.

In particular, this church urges present and, especially, future rostered leaders to gain a basic knowledge of genetics. In this way, ELCA leadership will be better able to aid individuals struggling to make a faithful response to the challenges presented by genetic knowledge. Likewise, they must be prepared to bring the wisdom of our faith tradition to those seeking to determine just and wise ways of using genetic applications, from debates in hospital ethics committees to questions of public policy.

⁴⁴ See, for instance, the ELCA's social message on "People Living with Disabilities" (ELCA, 2010) www.elca.org/disabilitiesmessage.

This church encourages teaching theologians, bishops, pastors, chaplains and others to reflect anew biblically and theologically about the meaning of *koinonia* and the virtues and practices needed to live into that aspect of Christian identity. We affirm theological attention to other themes and practices that have been and increasingly will be crucial for preaching, teaching and practical ministry, such as baptismal vocation, moral formation and community deliberation. In addition, we encourage attention within seminary curriculums to pastoral care issues stemming from advances in genetic sciences.

The ELCA encourages all rostered leaders to prepare reflectively to guide individuals through multiple misunderstandings about the meaning of genetic knowledge. There will be those who mistakenly believe that genes alone determine the destiny of humanity and the world, and who, accordingly, approach life with a kind of fatalism. There will be those for whom genetic knowledge leads them to believe that with genetic technologies all things are possible. There also will be those, on the other hand, who mistakenly believe that all new technologies are to be feared or avoided.

The ELCA calls upon its pastors and other rostered leaders to minister wisely with individuals who are grappling with genetic information that increases uncertainties and probabilities in their lives. It urges pastors and other rostered leaders to prepare to deal sensitively with those who experience the soul-searching anguish that results from genetically related conditions or human interventions that fail. As brothers and sisters in Christ, we also wish to find appropriate ways to rejoice with those for whom knowledge of genetic causes or human intervention bring joy or benefit.

This church urges pastors, parish nurses and other caregivers to seek out professionals, such as medical geneticists and genetic counselors, with whom they can work in care teams. Leaders in conferences, synods or other appropriate bodies are encouraged to compile lists of resources for their jurisdictions to which pastors and care givers can turn for help.

5.4 Church in society

The ELCA acts in the public sectors of society through its members, congregations, synods, social ministry organizations, related institutions and its churchwide expression. It commits itself to serve as a church that seeks to respect and promote the community of life by advocating for the just and wise application of genetic knowledge. This commitment will be lived out in many ways.

The ELCA seeks to contribute its best insights regarding the character of life in Christ and the good of society. It affirms that its members' baptismal vocation includes a strong communal dimension. It calls upon members and especially those who serve in social ministry organizations or advocacy to join together with all people of good will to support just and wise laws and policies that will guide the advance of genetic knowledge and its application.

The ELCA encourages its church-related schools, colleges and universities to prepare students in the sciences, applied sciences, humanities and business in such a way that they develop both expert knowledge and a service-oriented commitment to share what they know for the sake of others. It encourages these institutions to help students explore the connections between these arenas and faith. It calls upon its youth to consider how they might contribute to society's good by taking up such daily callings as medicine, research, commerce, agriculture, advocacy, political leadership, ethical reflection and rostered ministry.

The ELCA's social ministry organizations and agencies are places of compassion and service that can practice just and wise use of medical and commercial applications. This church encourages them to strengthen their role of sharing their informed perspectives in public debates regarding how genetic research and technology may be made available equitably and with appropriate access for those in need.

As a church in society, the ELCA recognizes that business decisions and public policy issues must be evaluated by key criteria informed by sound public reasoning available to all people. The ELCA proposes for public consideration the ethic to respect and promote the community of life with justice and wisdom in the pursuit of genetic knowledge and its use. The ELCA contends that this ethic is essential for the web of life on earth to flourish.

In particular this church hopes that this framework will be a starting point for conversation about genetics and its use with Lutheran brothers and sisters and ecumenical partners around the globe. It commits itself to joining with all others of good will in being directed by this imperative so that human beings can maximize the potential good and minimize the dangers of genetic technology for the sake of the blessed creation.

VI. Confidence

Genetic knowledge and its application introduce into the community of life a potentially mixed blessing. The power now available through genetic science and its various commercial and cultural uses requires diligent and sustained attention in order to direct its potential good and to limit its potential harm.

This church believes God, who is the beginning and the end of all, calls human beings to seek the good of the community of life of which it is a part. Human beings, as innovative stewards, have a distinctive freedom and power that are to be used for the sake of that community, but these powers are not unlimited, and we are accountable for their use.

Human beings must use these gifts without knowing all possible contingencies or being able to guarantee outcomes. This church recognizes that good and sin, possibility and finitude, hope and anguish, are always mixed together in earthly life. Lutheran Christians, nevertheless, claim with confidence that we are redeemed decision-makers who have been freed to discern and take actions using genetic knowledge in ways that strive to respect and promote the flourishing of the web of life.

The ELCA embraces the call to live into *koinonia*, leadership and public involvement in a time of ambiguity, possibility and challenge. It recognizes its role as a public church and prays for God's guidance even while acknowledging that our best efforts sometimes will be creative and successful and sometimes confused or misdirected.

This church will proceed with due caution to encourage the advance of genetic knowledge and technology, advocating for its just and wise use. It calls upon all members of the human community—especially those who exercise social and economic power—to recognize the weighty choices facing the human race with its unprecedented power in this 21st century. It calls for a sober analysis of how power is used in its social context. It calls upon all to recognize the wisdom of emphasizing long-term ecological, social and economic needs and giving priority to the common good.

It must be remembered that not all possibilities are equally acceptable and that choosing wisely now is crucial for the integrity of the community of life of which human beings are a part, upon which we depend, and for which we are accountable. The nature of responsibility in this age of unparalleled human power calls for wisdom, humility and courage in deliberation, decision-making and action.

In this 21st century, the church's trust exists not in human achievements, but in the Triune God who creates, redeems and will finish making all things new. This One is the source of Christian confidence to live boldly in these times; it is a confidence that runs from the beginning to the end of faith and responsibility in any age.

Glossary of Terms

(This glossary is for the reader's convenience only; it is not part of the adopted social statement.)

Allele: a variant form of a given gene, such that one individual differs in more or less important ways from other individuals on the basis of which variants have been inherited.

Assisted Reproductive Technology (ART): all fertility treatments in which both eggs and sperm are handled.

Base pairs: nucleotides on complementary strands of DNA that are specifically paired with a partner and linked, forming the “rungs of the ladder” and giving DNA its double helix structure. For example, guanine (G) always pairs with cytosine (C) and thymine (T) always pairs with adenine (A).

Biochemistry: the scientific study of the chemistry of cells, tissues, organs and organisms.

Biodiversity: the degree of variation of life forms within an ecosystem.

Biosphere: the sum of all ecosystems; the whole of earth.

Biotechnology: the use of biological processes of microbes and of plants or animal cells for the benefit of humans. When used in conjunction with genetic engineering, it is the genetic modification of an organism's DNA such that the transformed individuals have new traits that enhance survival or modify quality. Modern biotechnology is being used in medicine, fuel production, agriculture and food production, and criminal science, as well as in environmental activities.

Biotic community: all interacting organisms living together along with the soil, water and other features of earth upon which they depend.

BRCA1 and BRCA2: genes that normally code for a protein that restrains cell growth. Mutations in *BRCA1* and *BRCA2* are associated with Hereditary Breast and Ovarian Cancer, giving people very high risks for these tumors (but not necessarily always leading to their development).

Chromosome: physically separate packages of DNA located in the nucleus of a cell. Different kinds of organisms have different numbers of chromosomes. Humans have 23 pairs of chromosomes, 46 in all.

Clone: a group of genetically identical genes, cells, or organisms derived asexually, from a single ancestral cell.

Cloning: the process of making identical copies of an organism, cell, or DNA.

- *Human reproductive cloning* uses genetic material from one person's cells to grow an entire individual human being that has the same DNA as the donor
- *Molecular cloning* refers to the process of making multiple copies of a defined DNA sequence or fragment of DNA; this is used regularly in laboratories for a wide variety of clinical and research efforts.
- *Reproductive cloning* uses genetic material from one organism's cells to grow an entire individual organism that has the same DNA as the donor.
- *Therapeutic cloning* harvests stem cells to study development and treat disease; it could also be used to make specific organs or tissues for transplant to reduce the risk of organ rejection.

Codon: sequence of three consecutive nucleotides.

Community of life: as used in this document, indicates the web of life of all organisms and recognizes their interdependence.

Discernment: the capacity or process of perceiving and evaluating the meaning of many factors in order to make an appropriate response to God; often used about theological or moral reflection that involves study, prayer and dialogue that leads to a judgment or understanding about a particular situation.

DNA: deoxyribose nucleic acid, the substance of heredity; a large molecule that carries genetic information that cells need to replicate and to produce proteins. It is mainly coiled up (as chromosomes) inside the control tower of the cell, the nucleus. DNA is shaped as a twisted ladder, called a **double helix**.

Ecosystem: a biological environment consisting of all the organisms living in a particular area, as well as all the nonliving physical components of the environment with which the organisms interact, such as air, soil, water, and sunlight.

Embryology: the branch of biology that studies the formation and early development of living organisms.

Eugenics: literally meaning “good genes,” the term usually indicates simply the study of hereditary improvement by genetic control. It may also refer to any intentional strategy to direct the course of the human species through encouraging the transmission of “desired” traits while discouraging the “undesired” ones. Such strategies could include selective mating, prenatal testing, selective abortion, forced sterilization, ethnic cleansing or others. However, it also may apply to such benign processes as the choosing of a spouse and the planning of a pregnancy.

Gene: the fundamental unit of inheritance; a working subunit of DNA.

Gene flow: the unintended movement of transgenes from a crop in one field to an adjacent field or surrounding environs, often via pollen movement.

Gene stacking: combining traits (e.g., herbicide tolerance and insect resistance) in seeds.

Gene therapy: treating disease by replacing, manipulating, or supplementing nonfunctional or dysfunctional genes.

Genetic determinism: the notion that human health and illness, character and behavior are shaped by the genes that comprise the individual’s genotype rather than also being influenced importantly by culture, environment and individual choices.

Genetic engineering: techniques used to manipulate genetic material (genes) of living cells. In the United States, under guidelines issued by the Department of Agriculture’s Animal and Plant Health Inspection Service, genetic engineering is defined as the genetic modification of organisms by recombinant technology. Definitions used in Europe tend to be broader.

Genetic Profiling: the use of genomic information to define a particular group.

Genetic testing: examining a sample of bodily cells or fluids for biochemical, chromosomal, or genetic markers that indicate the presence of or predisposition to genetic disease.

Genetically Modified (GM): an organism (GMO) produced by genetic engineering techniques that allow the transfer of inherited characteristics from one organism to another, and occasionally between species (see “gene flow” above). Living modified organisms (LMOs), genetically engineered (GE) foods and transgenic crops are other terms often used in place of GMOs.

Genetics: the scientific study of heredity (how particular qualities or traits are transmitted from parents to offspring); the term is often used broadly to include the ethical, social and legal questions that result from the knowledge of genetic science and its application.

Genome: the sum of the genetic material of a particular organism.

Genomics: use of information reflecting segments of the genome rather than single genes in assigning risk for disease, response to treatment or diagnosis.

Genotype: the collection of actual gene variants (alleles) carried by a cell, an organism or an individual. The genotype is distinct from the phenotype, which is the sum total of expressed features, including physical characteristics, resulting from a given genotype.

Global Village: a metaphor for the way in which we experience our world more immediately in an age where electronic media allow rapid dissemination of news and other information, so that it seems as though the entire planet is shrunk to the immediacy of a small location.

Human Genome Project: an international research effort (led in the United States by the National Institutes of Health and the Department of Energy) to sequence the base pairs, identify the genes, and understand the human genome. It includes efforts to address the ethical, legal, and social issues that arise from this knowledge. (*see* Genome)

***In vitro* fertilization (IVF):** any of a number of methods of combining sperm and egg outside the body. In humans frequently it is used in the treatment of infertility.

Intellectual Property: a term referring to the domain of law and patents referring distinct types of creations of the mind for which a set of exclusive rights are recognized. Common types of intellectual property include copyrights, trademarks, patents, industrial design rights and trade secrets in some jurisdictions.

Koinonia: Greek word typically translated as community or fellowship or communion, but having implications that include mutuality, reciprocity and unity in diversity committed to generous caring and a sense of responsibility for bearing the burdens of others in the fellowship.

Molecular Biology: the branch of biology that deals with formation, structure and function of molecules.

Molecular Medicine: the branch of medicine that develops ways to diagnose and treat disease by understanding the way genes, proteins and other cellular molecules work. Molecular medicine is based on research that shows how certain genes, molecules and cellular functions may become abnormal in diseases such as cancer. Molecular medicine forms the basis for personalized medicine (see below).

Mutation: a permanent and heritable change in the nucleotide sequence of DNA. Mutations may change a single base pair, may insert or delete one or more base pairs or may result in complex genetic rearrangements of large strings of nucleotides. In most cases, DNA changes either have no effect or cause harm, but occasionally a mutation can improve an organism's chance of surviving and passing the beneficial change on to its descendants. Larger and more complex mutations are more likely to result in a harmful outcome since they may impact more than one gene.

Nucleotide: the smallest integral subunit of information coded into the DNA (or RNA) molecule.

Organic Farming: is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.

Original Sin: this traditional Christian teaching refers to the human state of alienation from God; it has been understood as a universal and hereditary sinfulness or the unconscious human propensity to do evil. It is differentiated from what is called "actual sin" which is the self-conscious violation of God's law.

Paleontology: the study the fossilized remains of life.

Patent: when applied to genetics, the government regulations or requirements conferring the right or title to an individual or organization to genes if there has been substantial human intervention.

Personalized medicine: the practice of using a patient's unique genotype and phenotype to identify the best treatment for a given disease (for example, giving two breast cancer patients different chemotherapy based on the gene and protein

expression profile of their tumors and healthy tissue). Personalized medicine can also be used to predict and adjust optimal medication dosage, such as anesthesia, for a patient.

Pharming: merger of “farming” and “pharmaceutical” referring to the insertion of genes that code for useful pharmaceutical products into host organisms that would not otherwise express those genes.

Pharmacogenetics: is the branch of pharmacology which deals with the influence of genetic variation on drug response.

Physiology: study of the functions and activities of living organisms and their parts, including all physical and chemical processes.

Predictive/presymptomatic gene test: a test to identify whether an individual carries a genetic mutation associated with the development of a particular disorder. It predicts the likelihood that the disorder associated with the genetic mutation might occur.

Preimplantation genetic diagnosis (PGD): procedures that are performed on embryos prior to implantation, sometimes even on oocytes (egg cells) prior to fertilization, in order to determine the presence of a specific genetic sequence associated with a disorder. PGD is considered an alternative to prenatal diagnosis.

Prenatal diagnosis: the use of a wide variety of methods to learn about how a pregnancy is developing, with the intention of determining if a detectable abnormality is present. This includes imaging methods (ultrasound, etc.), measuring substances in the maternal blood, and removal of samples from the placenta, the amniotic fluid, or the fetus itself.

Recombinant DNA: DNA produced by joining together DNA extracted from two or more different sources such as cells or different organisms.

Ribonucleic acid (RNA): related closely to DNA but not usually the basis for storage of hereditary information from one generation to the next; rather it is one of the forms of genetic information employed within the cell to regulate its activities.

Single nucleotide polymorphism (SNP): differences in single nucleotides that commonly occur in DNA. These differences are generally benign and occur on average about every 1,000 bases.

Synthetic Biology: design and construction of new biologic functions and systems that are not found in nature.

Transgenic seed: the state of having genes which have been transferred from one species to another, for example by placing into a seed the trait which would protect the plant from an infectious disease that interferes with crop production.

Vocation: in this statement refers to a calling from God that comes both as gift and task. The ELCA understands baptismal vocation as God’s saving call to us in baptism that is lived out in joyful response through service to the neighbor in daily life. The human vocation here indicates God’s calling to the human race and each individual by virtue of being their creator. It concerns the purpose or goal of human life for every human being whether Christian or not.

Web of Life: includes all organisms and recognizes their interdependence.

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