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Faith and Healing: Perspectives in Psychoneuroimmunology — Project Title

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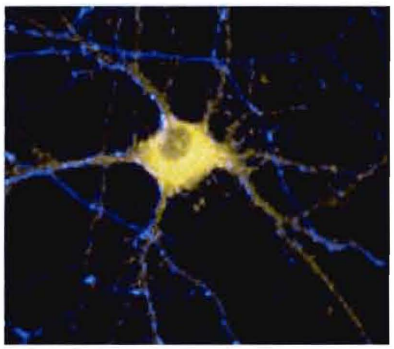
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DATE COMPLETED April 26, 2004

Faith and healing

PERSPECTIVES IN PSYCHONEUROIMMUNOLOGY





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Faith and Healing

Perspectives in Psychoneuroimmunology

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Introduction

The morning sun visited through the hospital window, passing to rest on the pages of her favorite verse of scripture. In moments the beat of her life was to be paused, only to be quickly revived in an advanced pacemaker replacement procedure. As I entered the room on my first rounds, her smiling face shared the joy and peace of her faith. Thankful for another day of life, she prayed for strength, comfort, and healing. I am grateful for the opportunity to serve as a student of medicine and will always remember the life of this dear lady and the moments of spiritual guidance and personal encouragement we shared. The miracle of the human life is the source of my motivation and fascination in medicine. It is through my respect for the cherished gift of life that I commit my knowledge and talents. I am thankful for the opportunity to serve in a generation of medicine that promises infinite opportunity for scholarly advancement and contribution to society in the care of individuals. It is through my contribution to medicine that I seek to encourage a standard of care that supports the physical, psychological, social, and spiritual needs of all individuals.

The human body orchestrates an elaborate physiology to support and sustain the marvel of life. The nervous system serves as the foundation for homeostatic regulation and coordination of body systems. A trichotomous perspective of neuronal responsibility involves the reception and interpretation of information about the internal and external environment of the body, the decisions made about this information, and the organization **and coordination of the responsive action [1]. Psychoneuroimmunology (PNI) is the study of the relationship between the mind, the immune system, and health [2]. The purpose of** this study is to observe the role of faith and spirituality in the healing process, suggesting

that faith affects the quality of health through the pathways defined by this field of scientific research. The focus of this research collaboration is to draw on studies that use natural mechanisms to explain the effects that religious beliefs and practices have on mental and physical health. This approach is a departure from misguided efforts to explain the effectiveness of religious practice in objective terms. Rather, the measurable physiological, psychological, and social variables of individuals are used to observe the importance of faith recognition in the treatment of individuals. This sound analysis promises to guide an understanding of the psychological and physiological determinates in the relationship of faith and health. With this wisdom, a standard of medicine is supported that respects the holistic needs of patients through the ethical application of spiritual care in the field of medicine.

"Remember to cure the patient as well as the disease" [3]. A focused care that considers the innate relationship of the mind, body, and spirit promises longevity and goodness in life. Stanley Hauerwas critiques two modern and unsatisfactory proposals that seek to coordinate the peace of religion with the achievement of good health. "The first advocates a strong division of labor between medicine and religion by limiting the scope of medicine to the mechanism of our body" [4]. Hauerwas counters this stance by joining with the prominent philosopher Paul Ramsey in support of the moral commitment a physician has to the patient before them rather than to the treatment of populations, diseases, or the human race [4]. The second alternative approach requires a "holistic vision of man, because the care it brings is but one aspect of salvation" [4]. Hauerwas's philosophy challenges the limits this standard of care imposes on physicians. With this generalized standard of care, physicians are led to areas of treatment that exceed their

professional training in clinical medicine. The ethical calling of physicians is to the health of their patients in a role that does not offer medicine as an avenue of spirituality [4]. The foundational tenet of medicine is to achieve an understanding of human physiology that leads to the attainment of good health. The theological principles of Hauerwas challenge these two proposals to create a successful approach to the relationship of religion and health. This ideal understanding removes health from an autonomous sphere, while instilling a reasonable expectation for the potential of medical care [4]. This standard of medicine maintains the ideal that medicine is not an agency of spiritual salvation. However, the success of the physician-patient relationship rests in the attainment of care that considers the oneness of the mind, body, and spirit. The great promise of holistic care rests on the mutual commitment of patients and physicians to their personal and professional responsibilities. A realistic expectation for physician care provides an avenue for the responsible incorporation of spirituality. It is through an open and honest dialogue between the physician and patient that a mutual understanding is gained in the relationship of the patient's faith and health. One of the primary objectives of my study is to encourage physicians to understand the spirituality of their patients, if any, and to responsibly incorporate this awareness in their care for the individual. With this approach, patients are guided to beneficial health behaviors and to a better understanding of themselves. It is through this heightened self-awareness that patients accept responsibility for their health, seeking to better themselves in mind, body, and spirit.

The first portion of this study focuses on the underlying biological mechanisms that are affected by personal faith. These biochemical pathways are fundamentally

system are in a continuous state of inhibition and stimulation of one another [5]. The immune system response is regulated by the production and release of cytokines, which serve as chemical signals through the bloodstream or nerves in various regions of the body [5]. The hormone CRH (corticotropin releasing hormone) is released from the hypothalamus, initiating the HPA (hypothalamic-pituitary axis) and the sympathetic nervous system response [6]. CRH stimulates the pituitary gland to release ACTH (adrenocorticotropic hormone), which stimulates the adrenal cortex to release glucocorticoids [6]. Cortisol is the most significant glucocorticoid, as it provides sympathetic stimulation while tuning down the immune system efficiency [5]. The effect of CRH on the brainstem regulates immune organ functioning and inflammatory responses throughout the body [5]. This pathway of communication between the nervous and immune systems is essential to the ideal functioning of the body. A disruption of this relationship in response to stress leads to a greater susceptibility to disease and immune complications. It is through the immune and inflammatory responses that healing is achieved. However, growing evidence points to these biological defense mechanisms in abnormal modes of function as the cause of many chronic illnesses [7]. It is through my study that I seek to create an understanding of these biochemical pathways in relation to the psychological factors associated with personal faith.

The biological mechanisms supporting the mind-body relationship provide a rational explanation of how devout religious beliefs and practices might affect not only a patient's sense of well-being and quality of life, but also their physical health and longevity [2]. It is vitally important in this discussion to understand that religious belief encompasses all personally edifying convictions that contribute to both interpersonal and intrapersonal

growth. It is not the goal of this and the incorporated studies to establish the validity of faith and healing. Rather, the aim of this study is to examine the therapeutic and healing powers of people's religious faith [8]. This foundational focus explores the biological relationship of the nervous and immune systems, diverging from a concern for absolute theological matters. A universal scope of religious belief and practice allows for an infallible scientific analysis of intrinsic spirituality. An important distinction in our analysis is the differing approaches of extrinsic and intrinsic spiritual perspectives. An extrinsic orientation "uses religion to obtain some nonspiritual goal" [8]. "Extrinsic religiosity can result from lack of exposure to a more authentic form of spirituality, or it can be a result of an unwillingness to become more intimate with God" [9]. Intrinsic religiosity, the focus of this study, involves a personal commitment to spirituality as the principal motivating force in life [8]. It is through this intrinsic spirituality that the positive correlation of faith and health is achieved. This research collaboration draws on studies of intrinsic spirituality and does not seek to rival various systems of religious belief. It does, however, encourage the medical community to provide the nurturing care and comforting assurance needed to support a healthy mind, body, and spirit relationship. Through this approach, individuals discover an inner-strength and resolve needed to transcend physical challenges, providing them with an "emotional resiliency" that serves as a key determinate of longevity [8].

The relationship of faith, health, and healing has been respected throughout history and into the modern era of medicine. The recorded histories of the Mesopotamian, Egyptian, Indian, Chinese, Greek, and Roman civilizations reflect the treatment of illness in religious or spiritual terms [2]. It was through these historical, and

many modern, religious rituals and practices that communities have longed for supernatural healing. Modern science, however, points to these behaviors as a determinate of physical health through natural mechanisms [2]. There are currently more than 850 studies that examine the relationship of religious belief or practice and mental health or social functioning [2]. The role of faith in an individual's life has been related to a heightened ability to cope with stress, a stable and positive view of oneself, a greater awareness and dependency on social support, an increased longevity of life, and the practice of positive health behaviors [2]. These advantageous aspects of mental and social health are fostered from an individual's use of faith "to place their physical conditions in perspective and give them the confidence needed to fight the illness" [8]. In addition to a more efficient coping ability, personal faith has been found to lower an individual's susceptibility for illness and provide them with a positive sense of well being, life-satisfaction, and happiness [2]. In this discussion of faith and health, it is important to understand the foundational social benefits of religious belief and practice. With respect for the extensive amount of research on the relationship of faith and health, this study seeks to create a concentrated perspective of the psychological and physiological variables affected by faith. It is through this approach that the initial discussion will focus on the affect of stress on health and the relationship of faith with the ability to manage stress. This psychological study will be further developed in relation to the interplay of the nervous and immune systems. These foundational standards of medical research on faith and health provide the groundwork for the development of clinical theories on the role of faith in many modern illnesses that plague large percentages of our population. This study serves as an invitation of understanding that will allow an

appreciation for the role of faith in your health and in the treatment of those in need. Dr. Herbert Benson reveres faith as an innate wisdom of life, "a visceral truth, something we can count on, something that remains the same; it is a part of our physical endowment **from the day we are born"** [3]. **It is through faith that we seek eternal and internal truth.** With this truth we are reminded that our faith is "an entrenched fact of human life; that, **when exercised and appreciated, has enormous power to heal us- mind, body, and soul"** [3].

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Section One: Stress and the Mind-Body Relationship

The mind-body relationship continually maintains a state of homeostasis, providing body systems with physiological conditions that support life-supporting processes. Neuronal pathways and hormonal centers throughout the central nervous systems control the release of substances that may indirectly modify the function of the immune system [1]. The primary function of the immune system is to provide defense against pathogenic microorganisms, restoring the desired homeostatic balance by eliminating internal aberations (malignancies) or external invaders (viruses, fungi, bacteria) [1]. As the centralized command center, the brain serves to regulate the efficiency of the immune system through the passage of efferent information through the central nervous system network. The purpose of this discussion is to capture the well-founded characteristics of the mind-body relationship, focusing on the central regulation of the immune system function. The perspectives offered by this study will provide a foundational understanding for the mechanisms affected by personal faith, seeking to establish the relationship between spirituality and wellness.

"The stress response promotes physiological and behavioral changes that enhance survival in threatening or taxing situations" [2]. This response changes the homeostatic balance and often impairs the efficiency of the immune system as it attempts to restore homeostasis [1]. The scientific community characterizes this sympathetic stimulation as the "fight or flight response," imposing inhibitions to the ongoing pathways of the body and stimulating needed physiological mechanisms of support [2]. The event altering homeostasis is known as a "stressor," and is characteristically initiated by stimuli such as fear, anxiety, intense exercise, or pain [1]. With integrated sensory and motor elements, the central nervous and immune systems possess the ability to receive stimuli, process information, and organize appropriate responses [3]. The

electrical communication provided by a network of neurons results in the release of chemical signals. These hormonal signals pass throughout the circulatory system and induce responses at locations presenting the specific receptors. This alteration of the hormonal concentration in the blood is regulated by the perception of the stimulus by the brain. Dr. Bruce Rabin of the University of Pittsburgh Medical Center has organized factors of causation in the perception of an event as a stressor.

1. Subject's coping ability- determined by social support, degree of optimism, physical conditioning, presence or absence of humor, and belief systems
2. Repetition and other stressors- how many times has the stimulus been perceived and the summation effects of other stressors
3. Strength of the stressor- how meaningful it is to the subject [1]

The response of the brain to the stressor involves the activation of specific neurons in the alteration of hormone concentrations [1]. These hormones are released from nerve terminals, endocrine tissue, and the hypothalamic-pituitary-adrenal axis, and exert their effects in lymphoid tissue, plasma, and within the parenchyma of various organs [1]. The predicted hormonal potential involves the regulation of the body's ability to resist infectious disease, produce autoimmune responses, and possibly prevent malignancy [1]. The growing knowledge of hormonal influence rests in the ability of the hormone to exert its effects in regions of the body that contain characteristic receptor sites. "If the cells of the immune system (CD4 lymphocytes, CD8 lymphocytes, B lymphocytes, NK lymphocytes) have receptors for the hormones whose concentration is altered by stress, the function of the lymphoid cells may change" [1]. The inherent balance of the immune system is an important aspect of this regulatory mechanism. Helper T-cells serve as an example of this codependent regulation, as type I and II CD4 cells have the ability to regulate the function of other cells [1]. The ongoing changes in the blood

hormone concentration have the ability to impose changes in other cells and tissues. Neutrophils and endothelial cells are directly affected by hormonal changes, altering their functional abilities of direction and bacterial removal from the body [1]. It is through this hierarchical organization of the central nervous and immune systems that a foundational understanding is gained in the understanding of stress-imposed changes of immune system function.

The responsiveness an individual has to stress is genetically determined and conscious control mechanisms have yet to be clinically defined [2]. The central nervous system mediates physiological changes that are observed in the rapid appearance of catecholamines in the blood and immediate increases in heart rate by the stimulation of the adrenergic receptors [1]. A review of the overlapping responsibilities of specific areas of the brain is vital to our discussion. Dr. Bruce Rabin has created simplistic characterizations of specific brain regions and their corresponding functions that relate to the overall immune system efficiency.

- CRH-containing neurons in the medial parvicellular division of the hypothalamus

  This region of the hypothalamus is involved in the release of several hormones that regulate the release of other hormones from the anterior pituitary gland. The most important hormone released from the parvicellular neurons is corticotropin-releasing hormone (CRH), which causes the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary gland. These changes are thought to influence the immune system by alterations in the concentration of plasma corticosterone [1].

- Periphery of the posterior magnicellular division of the hypothalamus

  Oxytocin, a vitally important hormone involved in child labor, is secreted from these neurons in the posterior lobe of the pituitary. It is through the stress-induced activation of these neurons that brain stem autonomic activity is regulated, participating in behavioral modifications [4].

- Dorsomedial nucleus of the hypothalamus

  The termination points of these neurons occur at synaptic junctions with other nuclei in the hypothalamus. It is believed that this region of the central nervous system plays an integral role in the regulation of fear and cardiovascular responses to emotional stimuli [1].

- Lateral hypothalamus

  Research studies suggest that these neurons participate in the "regulation of delayed hypersensitivity, natural killer (NK) cell numbers in the blood, and NK cell function [5].

- Medial nucleus of the amygdala

  The neurons of this region of the central nervous system are stimulated by the sensation of pain, responding through the release of ACTH by the pituitary gland. It is through this pathway that connections to immune system regulation are founded on the increases of glucocorticoids in response to stress [1].

- Ventral subdivision of the lateral septal area

  Activation of this area of the brain is associated with anxiety development.

- Lateral edges of the central nucleus of the amygdala

  Only scientific hypotheses have been made concerning the role of these neurons. It is with these assumptions that immune system regulation is achieved in the release of glucocorticoids and neuropeptides [1].

- Dorsomedial nucleus and basal ganglia of the thalamus

  This region contains cells that connect and conduct sensory, motor, and cognitive abilities [1].

- Nucleus of the solitary tract

  This area of the brain is associated with heart rate regulation [1].

- Noradrenergic neurons of the A5 and A7 areas

  These neuronal projections end in the spinal cord and are involved in the activation of the **postganglionic neurons that innervate secondary lymphoid tissues** [1].

- Locus Ceruleus

  These neurons project to the amygdala, thalamus, hypothalamus, and spinal cord, which project to the sympathetic ganglia and adrenal gland. As these norepinephrine-containing neurons are activated, a suppression of lymphocyte function is observed in the spleen and peripheral blood of **rats** [1,6].

- Periaqueductal gray matter

  This region of the brain surrounds the cerebral aqueduct in the midbrain. A study that involved the injection of morphine into this region of the brain altered the function of lymphocytes and NK cells. **However, the pathway of this neuroimmunological relationship is unknown** [1,7].

The Sympathetic Nervous System Release of Catecholamines

Sympathetic postganglionic neurons innervate many organs and tissues throughout the body. The primary and secondary lymphoid organs and the spleen present a high degree of **noradrenergic postganglionic sympathetic fiber innervation** [1,7]. **Scientific research also supports the presence of β-adrenergic receptors for catecholamines on lymphocytes and monocytes** [1,8]. A compelling study involving administrations of epinephrine proved to increase the concentration **of CD8 lymphocytes and NK lymphocytes in the blood** [9]. **This study also provided information** regarding the decreased responsiveness of lymphocytes to mitotic stimulation by nonspecific **mitogens** [9]. **In a 1995 study, a division of patients into a group with saline injections and a group** with adrenergic antagonist injections provided intriguing information regarding immune function alteration following a mental stressor. The conclusions shared captured the quantitative and

qualitative alterations of immune system functioning in patients injected with saline and subjected to the mental stressor. The defining observations in the patients with the adrenergic antagonist portrayed a failure to produce immune system changes following the stressor [10]. These pioneering studies prove a direct relationship between the activation of the sympathetic nervous system release of catecholamines and the resultant alterations in immune system functioning following a mental stressor. It is through this guidance that continued research efforts focus on this relationship to gain a greater understanding of the imposed immunological challenges presented by perceived stress.

The Hypothalamic-Pituitary-Adrenal Axis and the Release of Glucocorticoids

The glucocorticosteroid cortisol is the primary end product of the hypothalamic-pituitary-adrenal axis following activation [1]. CRH, released by the parvicellular neurons in the hypothalamus via neuronal projections in the median eminence, travels to the dense capillary beds of the anterior pituitary gland and stimulates the release of ACTH [1]. This pathway of ACTH activation results in the synthesis and secretion of glucocorticoids from the adrenal cortex located above the kidney [1]. In comparison to the time differential of the sympathetic nervous system activation, the HPA axis is a slower response that does not peak until about ten minutes following the stressor activation [11]. Type I and type II glucocorticoid receptors are present in the body, with the type II receptors having a sixfold to tenfold lower affinity [12]. These type II receptors, but not the type I, have been detected in the thymus, spleen, and lymph nodes [12]. It is through this research finding that the immune system response appears to be modulated by the concentration of circulating corticosterone. These scientific observations provide the foundational relationships between the hypothalamic-pituitary-adrenal axis and the concomitant

immune system regulation. It is through this and further research that an enhanced perspective is gained for the interrelationships of the sympathetic nervous and immune systems.

Additional Endocrine Hormones of the Stress Response

A review of additional endocrine hormones included in Dr. Rabin's analysis is provided below.

- Endogenous Opioids

The endogenous opioid system has been scientifically proven to play a role in the stress response [13]. The presence of opioid receptors on immune cells opens the possibility for opioid mediation-induced alterations in the immune system response following a stressor [14].

- Substance P

"Substance P is a neuropeptide classified as a tachykinin (i.e. it elicits an increased heart rate after it lowers blood pressure)" [1]. This neuropeptide is released from sensory nerve fibers and promotes localized inflammation. Substance P receptors are present on the membranes of T and B cells, mononuclear phagocytic cells, and mast cells. It is through the diverse receptor locations that substance P is thought to serve as a bridge between the stress response and immune system regulation [1].

- Neuropeptide Y

Neuropeptide Y is a product of neurons in the central nervous system and in tissues throughout the body. Lymphocytes bear receptors for Neuropeptide Y, as it is co-localized in the nerve terminals of lymphatic tissues with norepinephrine [1, 15]. These characteristic traits of Neuropeptide Y allow its regulation by higher brain centers, providing diverse neuronal modulation of immune system activity.

- Somatostatin

  Somatostatin is released from sensory nerve terminals and lymphoid tissues, which regulate lymphoid follicles of the gastrointestinal tract [1]. Somatostatin receptors have been discovered on lymphoid cells, suggesting possible regulation of immunoglobin synthesis [16]. As a second link to immune system functioning, NK function and immunoglobulin synthesis decreases in response to somatostatin administration [17].

- Vasoactive Intestinal Peptide

  This protein is found in the central nervous system and peripheral nerves. There are vasoactive intestinal peptide receptors on both T and B lymphocytes and binding of this peptide to its receptor on lymphocytes increases cAMP production [18, 19]. This discovery serves as a direct link to lymphocyte responsiveness.

- Growth hormone and insulin-like growth factor

  Growth hormone and insulin-like growth factor coordinated their effects to stimulate the growth of the body, tissue metabolism, and tissue repair [1]. Receptors for GH are present on lymphoid cells, and GH is a hormone that is elevated in times of stress [1,20]. These discoveries provide a direct correlation between the stress response and immune system activity.

- Prolactin

  In addition to the primary production in the pituitary, prolactin is produced by lymphoid cells where there are also receptors [21]. Prolactin concentrations also increase in times of stress, providing immune system regulation during stress and in response to antigens [22].

- Melatonin

  Melatonin is produced by the pineal gland in conditions of no light [1]. The melatonin receptors are present on lymphoid cells, suggesting possible regulation of immune system response [23].

Continuing research efforts seek to provide a distinct correlation between melatonin and immune system functioning, as challenges arise in the regulation imposed by circadian rhythms.

The Relationship of Stress and the Immune System

"Stress-induced alteration of the immune system occurs in the secondary lymphoid tissues (spleen, lymph nodes, and mucosa-associated lymphoid tissues), where effector T cells are produced from naïve T cells, and T-cell help is provided to B lymphocytes" [1]. Immune system functional modifications are mediated by changes in the hormonal environment of the blood, principally the glucocorticoids and catecholamines. As research continues to gain insight to the mechanisms of immune system higher command centers of the brain, it is also important to consider the feedback mechanisms offered by the immune system in regulation of brain activity. It is through these two pathways of understanding that the stress-buffering effects of beliefs and behaviors promise positive contributions to health [1]. The brain response to a stressor is initiated by increases in the intranuclear concentrations of protein in the activated neurons [1]. This characteristic phase of activation leads to the neuronal transmittance offered by the sympathetic nervous system and the hypothalamic-pituitary adrenal axis. The focus of present research efforts is to establish the psychological criteria for the physiological changes that accompany stress. Revisiting the teachings of Dr. Bruce Rabin, his research efforts have led to the distinction of three factors that may contribute to the response of the brain to the stressor.

- Perception: individual-specific analysis of the situation, how a person perceives a stressor [1].
- Habituation: whether the stress-reactive areas of the brain are habituated following repeated activation. It is through repeated encounters with stress that individuals have an enhanced psychological ability to cope. For example, physically fit individuals present less hormonal responses to psychological stress [1].
- Suppression: "whether behaviors that are considered to ameliorate the effects of stress on the immune system do so by activating areas of the brain that suppress activation of

> the stress-responsive areas." This observation seeks to describe the interference of immune system alterations presented by stressed individuals that have a more optimistic, positive view of life [1].

It is through these individual-specific determinates of quantitative and qualitative stress that science points to enhanced coping abilities as a remedy to the imposed immune system alterations. This understanding forms the scientific foundation to the application of spirituality in the practice of medicine.

Conclusions

"Although many questions remain regarding the relationship of stress to immune function, it is apparent that information from the central nervous system (brain) to the immune system is transmitted through several pathways, inducing changes in immune function that are either short- or long-lived" [1]. The orchestration of the stress response by the sympathetic nervous system, endocrine system, and the hypothalamic-pituitary-adrenal axis is scientifically proven to alter immune system function. It is through the foundational understanding offered in this session that the guided comprehension of the mind-body relationship supports an appreciation for patient spirituality in the treatment of illness. The elementary research on the relationship of spirituality and immune function supports the stress-buffering effects of faith. As this field of science continues to gain concentration and specialization, progress will provide a greater understanding of the stress response and the interdependence of the mind, body, and spirit.

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Section Two

Chapter One: Understanding Stress and the Faith Factor

"We will never fully know how the faith factor works, because the transcendent dimension of life does not yield up all of its secrets to even the most skilled and aggressive researchers" [9]. Dr. Dale Matthews, associate professor of medicine at Georgetown University School of Medicine, has devoted much of his scientific research to the characteristic sense of well being, inner peace, and collective strength shared by people of faith. His exhaustive clinical studies have championed a systematic representation of holistic care that considers the needs of the mind, body, and soul. It is beneficial to understand his remedies of faith that seek to capture the universal health rewards individuals receive from religious belief and practice [9]. The following lists established aspects of spirituality and character:

- Equanimity: overcoming the wear and tear of life
- Temperance: honoring the body as a temple of the spirit
- Beauty: appreciating art and nature
- Adoration: worshiping our whole beings
- Renewal: confessing and starting over
- Community: bearing one another's burdens
- Unity: gaining strength through shared belief
- Ritual: taking comfort in familiar activities
- Meaning: finding a purpose in life
- Trust: "Letting go and letting God"
- Transcendence: connecting with ultimate hope
- Love: caring and being cared for [9]

It is through the collective orchestration of these respects that the psychological and physiological variables of an individual's life gain enhanced efficiency. Each of these characteristics contributes to an understanding of individual purpose and meaning,

allowing a sense of unfailing joy and peace. Research establishes religion as a foundation for these character traits, inspiring individuals and health care providers to embrace spiritual aspects of life [10].

"Stress is a negative emotional experience accompanied by predictable biochemical, physiological, cognitive, and behavioral changes that are directed either toward altering the stressful event or accommodating to its effects" [6]. The stress response we observed in our physiological analysis is minimized in individuals that possess an assurance in their ability to cope with the stressful experience [10]. It is through the belief and practice of religion that individuals find hope in the challenges of life. With this hope, the arduous demands of stress and coping are perceived as opportunities for personal and spiritual growth [10]. Dr. Harold Koenig and his research teams at Duke University School of Medicine continue to observe the relationship of one's religion and their ability to cope with stress. These research efforts have established religion as an inhibitory determinate to the stressor-induced activation of hypothalamic and pituitary pathways of immune function modification [2]. This relationship supports the idea that religious belief and practice provides the ideal hormonal environment that facilitates greater resistance to the development of infectious disease [2]. The decrease in sympathetic nervous system stimulation lessens the imposed inhibitions on immune organs and tissues. Interpretations of psychological efficiency in the regulation of the immune system are further developed in the studies of J.W. Hoffman's research team. It was with this effort that clinical trials established an increase in catecholamine stimulation as the requirement for a stressor to produce an increase in heart rate and blood pressure [11]. The determined conclusion was a result of research observations that focused on a collection of students trained to relax, increasing the efficiency of the immune system response. A

physiological analysis of this group of students in comparison to a control group reflected a greater increase in the physical stressor-induced plasma norepinephrine concentration [11]. A similar study published in the *Postgraduate Medical Journal* determined a higher plasma catecholamine level in subjects involved in proficient transcendental meditation [12]. This study reflects the positive physiological result of the practice of spiritual confrontative coping. It is through meditative religious practices and prayer that individuals confront the challenges in their lives, seeking personal growth and inner peace. As we observe the need for spirituality in medicine, an examination of the stress-imposed psychological and physiological demands is vital to our discussion.

- Psychological Determination of Susceptibility to Infection: Influenza and Herpes Viruses

The invasion of the body by a disease-causing agent is not sufficient to initiate the progression of the illness. A presentation of the disease in a patient is a result of a compromise in the host defenses upon infection, negating the ability of the body's natural defense mechanisms [2]. "Psychological variables that influence immunity have the potential to influence the onset and progression of immune system-mediated diseases" [2].

The early work of Meyer and Haggerty in 1962 indicated that "both disruptive daily events and chronic family stress were associated with greater risk for upper respiratory infections" [14]. Continuing studies reflected this relationship between stress and immunosuppression, with a hallmark study in 1989 by R.D. Clover and his colleagues on a patient's susceptibility to the influenza B virus [15]. It was through this study that objectively determined stressed families had a greater incidence of disease than nonstressed [15]. A common challenge to these studies was that the resultant infection was imposed by "stress-induced increases in exposure to infections" rather than to the "stress-

induced immunosuppression" [2]. Cohen, Doyle, and Skoner (1999) infected individuals with the influenza virus and researched the relationship of virus presentation and their objectively measured stress level [16]. The focus of this study was on the production of mucus and interleukin-6 (IL-6), a "pro-inflammatory cytokine that has been thought to represent a pathway linking stress through the immune system to illness" [6]. The results of this study reflected the predicted hypothesis, that "psychological stress led to a greater expression of illness and an increased production of IL-6 in response to the viral challenge than was true of people exposed to the virus whose lives were less stressful" [6]. A second result of this study focused on the severity of the illness presentation, with the chronically stressed individuals having more severe symptoms of the influenza virus. An earlier study by Cohen and colleagues in 1998 demonstrated that chronic stress predicted a heightened susceptibility to upper respiratory infections, while acute stress did not [17]. This study also found that the relationship between chronic stressors and susceptibility to the common cold could "not be fully explained by differences among stressed and nonstressed persons in social network characteristics, personality, health practices, or pre-challenge endocrine or immune measures" [2]. A common observation in each of these clinical studies was a release of too much of the interleukin-6 chemical messenger for inflammation. It is predicted that a "stress-induced failure" to terminate the release of this cytokine is responsible for the increased susceptibility and severity of illness presentation [2]. In summary, stressful life events and psychological stress (perceptions and negative affect) are associated with increased susceptibility to upper respiratory infection [2]. The foundational theory to this relationship is that stress provides a

deregulation of the immune response and a concomitant lowering of the body's defense mechanism capabilities.

A second viral infection of research collaboration that is beneficial to our observations is the herpes simplex virus. Herpesviruses are present in the infected individual at all times following exposure and are often in a latent state [2]. The role of cellular immunity is to combat the initial exposure and infection, and to protect the body by maintaining a latent state once infected. E.F. Hoon and colleagues published a premiere study of herpesvirus infection and stress relation on a representative group of 125 college students [18]. The conclusions of their research findings were that "stress increases vulnerability to illness in general (nonherpes), and that it is this increase in nonspecific vulnerability that results in herpes reoccurence" [2]. This study did not point directly to a lower immune system function as the primary determinate of vulnerability; rather, their conclusions reflected a relationship between the vulnerability and a heightened state of susceptibility to infectious diseases [2]. Therefore, these studies indirectly reflect lowered immune system proficiency under conditions of chronic stress. The direct correlation between negative moods, chronic stress, and immunosuppression reflects the need for psychological and spiritual intervention. It is through the psychological factor determination of an individual's stress level that spiritual coping provides promise for the maintenance of elevated immune system functioning.

- The Integration of Social Support in Psychoneuroimmunology

The clinical observations of upper respiratory infections, herpes virus, and chronic stress portray the need for patient care that spans beyond the scope of pharmacological intervention. This collection of various studies in the field of psychoneuroimmunology

reflect "consistent and convincing evidence of links between stress and disease onset and progression" [2]. It is through the psychological management of stress through involvement in encouraging social communities that individuals have the opportunity to buffer stress. It is through the psychological and social components of spirituality that these specific needs are met, and individuals approach stressful live events with purpose and confidence. With this focused directive, ideal immune system potential is maintained in the physiological mechanisms that defend illness.

In the regulation of immune system functioning, interpersonal relationships have been found to be a primary determinate of health [2]. The presence of an encouraging social network is an inherent aspect of a religious community. With this appreciation, this study will only draw on a select research group to profile the wealth of clinical applications to social support and illness susceptibility. The pioneering studies that focus on the importance of diverse social networks have distinguished social and religious groups to "suffer less illness and live longer than their more isolated counterparts" [2]. A study of first-year medical students in 1985 developed the correlation of perceived loneliness and immunity. This research characterized individuals with higher self-reported loneliness to have lower natural killer cell activity and higher levels of herpesvirus antibody than those who described themselves as less lonely [19]. It is through a heightened awareness of purpose and belonging that individuals psychologically support the hierarchical regulation of body-defense mechanisms. The diverse nature of social ties has also been correlated to an increased resistance to infection. In a study published by the *Journal of the American Medical Association*, researchers from Carnegie Mellon University found that "individuals who had a greater variety of social

relationships were more able to resist infection with the common cold virus" [20]. In this study 276 subjects were assessed on the basis of their diversity of relationships. The researchers documented the health habits of each subject and then exposed them to a cold virus [20]. A detailed observation of symptom presentation was created for each subject and a correlation was developed that supported the relationship of social relationship variability and heightened immune functioning.

Number of Social Relationships	Percentage of Subjects Presenting the Cold Virus
0-3	62
4-5	43
greater than 6	35

The number of self-reported social relationships with family, friends, and religious communities allowed the researchers to obtain a relative measure of social support [20]. The collaborative research efforts of Stanford University and the University of California found that women with breast cancer in support groups lived an average of eighteen months longer than patients without support [21]. This promising clinical study was followed by an examination of other possible factors of patient life longevity. These exhaustive analyses pointed only to support-group participation as the determining factor of increased longevity [9]. Herbert Benson of Harvard Medical School states a belief that humans are "wired for faith and that there is a special healing generated by people who rely on faith" [3]. In coordination with this inherent healing capability is a personal need for interpersonal relationships [9]. In the nineteenth century many orphaned babies died of a condition known as *marasmus*, which diagnosed a "failure to thrive" [9]. The scientific community instituted "mothering" techniques for these children which guided their psychological and physical growth during the early ages of life. "Once mothering was

introduced at Bellevue Hospital in New York, infant mortality rates dropped precipitously, from around 35 percent to under 10 percent" [9]. These hallmark scientific discoveries support the vitality of a stable support system and the betterment of health.

The scientific community has devoted much research in support of a positive correlation between social networks and wellness. As we observe this relationship in the context of the role of faith in the healing process, an important distinction to observe is the increased effectiveness of religious versus secular communities [9]. Dr. Dale Matthews has devoted a thorough scientific analysis of this distinction and observes that "participation in religious congregations or groups can deliver more health benefits through social support than participation in non-religious organizations, and that both the quantity and quality of social interactions tend to be greater among religiously active people" [9]. A hallmark of scientific research on this relationship was published in the American Journal of Public Health in 1996. This fifteen-year study involved an arduous analysis of mortality rates among two groups: 2,123 members of eleven secular kibbutzim peoples and 1, 777 members of eleven religious kibbutzim peoples [22]. Common variables of control in this population were actively monitored, insuring the accuracy and consistency of demographic influences. The results of this study showed that 192 deaths among the secular kibbutzim members (eight percent) and only 69 deaths among the religious kibbutzim members (four percent) [22]. The distinct longevity of life in the religious members was a result of a "protective effect across the whole spectrum of health problems" [9]. Dr. Dale Matthews has shared a great amount of research interpretations with this dramatic illustration of health benefits with religious social support. He created four lifestyle and spiritual standards that provided the observed

longevity in practicing religious kibbutzim members. These principles of religious social support capture the favorable effects of commitment to a religious community.

- Religiously observant people have better health habits.
- Religious members attend worship services more frequently.
- Religious members enjoy stronger marriages and other forms of social support.
- Religious members may have a stronger sense of purpose and meaning [9].

Throughout many religious traditions, a commitment of love to a supernatural being fosters a unique bond between individuals of the practicing community. It is with a sincere life-commitment to a standard of faith that individuals find both eternal purpose and a unifying peace with fellow believers. The ties between religious commitment and physical health were further magnified in a study by Koenig et al. in 1997 [23]. This research team from Duke University observed biological markers of inflammation in a large population of individuals in the Establishment of Populations for Epidemiological Studies of the Elderly (EPESE). Religious attendance measures were taken in 1989 and 1992 on 1718 subjects, each of which was characterized using psychiatric assessments [23]. At each of these times of observance, an inverse relationship was observed in church attendance and interleukin-6 levels [23]. The other measured inflammatory markers yielded a similar trend, supporting the claim that religious participation yields a more optimum physiological state. In response to the promising support of scientific research, Dr. Koenig has developed two categories of pathways through which religious participation might influence health.

1. "Religious participation can contribute to the diversity of one's social network, enhancing beneficial cognitive and affective states, as well as promoting behaviors that benefit health."

2. **"Religious participation can provide the potential for reducing stress via the availability of coping resources** [2].

The diversity of an individual's social network is scientifically understood to provide a greater resistance to infectious agents [2]. It is through a web-like support system that individuals find a mutual sense of accountability and dependence, upholding common controls that may promote positive health behaviors. This connectivity inspires an acceptance of individual responsibility and purpose. The promotion of positive psychological states in a social network serves as "a source of generalized positive affect, senses of predictability and stability, a sense of purpose, a sense of belonging and security, and a recognition of self-worth because of demonstrated ability to meet normative role expectations" [2, 24, 25, 26, 27]. This response of Dr. Harold Koenig to earlier clinical writings aptly captures the spectrum of psychological benefits offered by a strong social support system. He continues his systematic analysis by concluding that "a wide range of network ties provides multiple sources of information and thereby increases the probability of having access to an appropriate information source" [2]. Finally, Dr. Koenig's analysis observes the tangible assistance offered by an individual's social network that contributes to better health and care during illness [2]. It is through this systematic respect for the benefits of social support that mutual accountability and health are achieved.

A consistent network of social support serves as a buffer to stress in the prevention of adverse physiological changes that accompany stress. The continued observances of Dr. Koenig and his colleagues focus on two points of the chain linking stressors to illness [2, 28, 29]. The first observance of the corresponding research is that the appraisal of a situation is calibrated by a dependence on the support of others [2, 30]. The

potential harm of a stressful event is approached with a greater amount of confidence, lessening the impact of appraisal and overcoming conclusions of inadequacy. A second conclusion of this research embodies the effects supporting beliefs have in the reduction and elimination of the reaction to the imposed event [2]. This concept of sharing allows individuals to divert from the intrusive thoughts that initiate harmful physiological stress responses. It is through these two avenues of support that individuals find a higher sense of purpose and meaning, inspiring a dependence and reciprocation of relational support. With this interdependence and accountability, individuals potentially alleviate the adverse physiological modifications that accompany stress.

The application of social support to the relationship of religion and health includes a reduced level of anxiety, providing an accepted purpose and meaning in life that fosters a responsibility and control of life events [31]. There are two contrasting perspectives that seek to define and contrast the social support provided by religious and secular communities. The first states that religious participation is no different from other forms of social participation [2]. This approach finds equality in both the quantity and quality of social support provided to the members. An alternate approach distinguishes aspects of a religious community that provide more effective means of cohesive support. A foundational thought in this comparison is that, in general, people of faith find greater identification with and commitment to the beliefs and norms of their community [2]. It is through this sense of unifying purpose that people of religious communities feel responsible for the well being of others. In coordination with these principles of thought is the observation that many religious communities support a diverse social network that serves as an "access point" to other social endeavors [2]. In

review of scientific literature, it is found that "frequent churchgoers have larger social networks, more contact with network members, more types of social support received, and more favorable perceptions of the quality of their social relationships than do nonmembers" [2, 32, 33]. These observational analyses of religious communities point to a standard of personal commitment and mutual accountability that transcends those values found in secular communities. This theoretical model is the result of only a small body of psychosocial studies, with a remaining need for further analysis to reach substantial conclusions. However, it is through these models of social support in religious communities that the hope of possibility attracts the efforts of continuing research endeavors. As the field of medicine continues to explore the intricacies of faith and social support, the advancement of knowledge encourages a standard of holistic care for all individuals.

Stanley Hauerwas maintains that the demands put on those who care for the ill imposes a need for "something very much like a church" to sustain the ideal level of care [4]. The inherent aspects of illness and pain conceive a barrier of understanding between the worlds of the sick and the healthy. "No matter how much we may experience the former, when we are healthy or not in pain, we have trouble imagining and understanding the world of the ill" [4]. Hauerwas further develops the theoretical barriers of understanding in the "subworlds" of illness, claiming that individuals of different illnesses cannot understand nor bear the sufferings of one another [4]. "The physician learns our deepest fears and our profoundest hopes," serving as the gateway of understanding between the sick and the healthy [4]. "Medicine needs the church not to supply a foundation for its moral commitments, but rather as a resource of the habits and

practices necessary to sustain the care of those in pain over the long haul" [4]. Hauerwas observes the unity of spirituality and medicine, encouraging a standard of medicine that embraces spiritual practices in times of success and disappointment. As illness creates personal and interpersonal separation, the religious community serves as a unifying continuum that provides purpose and belonging [4]. An important aspect of Hauerwas's philosophical perspective is that individuals "too often try to substitute doing for presence" [4]. It is through a higher spiritual calling that individuals find true empathy for fellow believers, inspiring a personal commitment to the care for others. The unifying power of faith provides an intimate bond of trust and mutual support for patients, community care providers, and physicians. A respect for the spiritual needs of patients provides holistic care that embraces the realness of illness and inspires a collective acceptance of hope.

"Western society and medicine often do a great deal of harm to the human spirit by focusing on specifics rather than the big picture. We end up taking away from the awe-inspiring truth, that the mind and the body are remarkably good at keeping us well, and that all of us share these healing properties in common" [3].

A collective and mutual respect for the spiritual aspects of life ultimately allows individuals to gain a higher sense of individual purpose and unity with others. The prominent religious traditions of the world have always valued the sense of community shared between fellow believers [9]. It is through these interpersonal relationships that personal joys and struggles are shared effectively, promoting good health and a positive psychological perspective of life. This inherent accountability goes beyond the intact community of believers, allowing application in diverse social networks and in the clinical setting. As we observe standards of the physician-patient relationship, a shared

respect for spirituality provides a greater sense of trust and application edifying behaviors and thoughts.

- Remembered Wellness in the Healing Process

Herbert Benson, the founder of the Mind/Body Medical Institute at Harvard University Medical School, creates a model of remembered wellness in the intimate relationship of the mind and body [3].

The Three Components of Remembered Wellness

1. **Belief and expectancy on the part of the patient**
2. **Belief and expectancy on the part of the caregiver**
3. **Belief and expectancy generated by a relationship between the patient and caregiver** [3]

" Belief in or expectation of a good outcome can have formidable restorative power; whether the positive expectations are on the part of the patient, the doctor or caregiver, or both" [3]. **Clearly, the need for trust in the physician-patient relationship is met by a** discussion that is factual and constructively uplifting. It is through the responsible incorporation of the spiritual dimensions of the patient's life that progress is achieved by remembered wellness. Dr. Benson's phrase of "remembered wellness" is a renaming of the common placebo effect [3]. In this experience, patients show signs of healing following times of encouragement and hope [3]. Reflecting on the scarcity of research endeavors focused on the placebo effect, Dr. Benson's investigations point to belief as the catalyst of remembered wellness [3]. Research trials on the physician-patient relationship by Drs. Sherrie Kaplan and Sheldon Greenfield at New England Medical Center in Boston involved the coaching of patients in their dialogue with physicians. In this study, a lower blood glucose level was recorded in coached patients, suggesting greater control of the disease [13]. It is with the assurance and hope provided by a positive physician-patient

relationship that patients are able to minimize psychological stress. With this ideal management of disease anxiety, patients foster inherent self-beliefs that promise an optimal psychological regulation of the healing process.

"Faith, that is, longing and expecting that what we long for will occur, helps our bodies recall the messages and instructions associated with what we long for" [3]. The psychological dimension of healing provides direction to the physiological mechanisms of the body. With this interrelationship, in times assessed as despair and disability, the body will often respond with impairment [3]. The incorporation of remembered wellness in medical care provides patients positive images of regaining a higher standard of health. Dr. Dale Matthews parallels these thoughts with a reflective description of an eighteenth-century medical procedure, which drained blood from an individual with illness. From a physiological perspective the majority of these individuals should have died due to the excessive loss of blood, as observed with hemorrhages. With the endorsement of esteemed physicians, people of this time believed in the efficacy of this treatment and often found healing through this procedure [9]. It was through the applied belief of these patients that their psychological perspectives guided the positive renewal of physiological wellness. The ongoing questions that capture the deepest thoughts and spiritual convictions have the inherent ability to influence our physical and mental well being. For many, religious faith "seems to offer the best access to the supreme meaning that gives purpose to our lives on earth and hope for a life in the world to come" [9]. The hopeful expectancy that faith brings transcends experience and base reality, fostering the process of remembered wellness and stimulating the neurological processes of healing that mobilize behaviors and reactions [3]. Spirituality provides the gateway of higher

understanding and engenders positive psychological perspectives of healing that provide comfort and peace. It is through remembered wellness and the integration of spiritual care that patients find assurance and hope in times of illness.

Dr. Randolph Byrd published the first pioneering study of intercessory prayer. This ten-month study divided coronary care patients into two groups: one group of 192 patients received intercessory prayer and a second group of 201 patients received no such prayer [36]. The knowledge of the patients receiving prayer was strictly controlled. The findings of this research study were "highly provocative," as heart patients who were prayed for were less likely to require antibiotics for infection, two and a half times less likely to suffer congestive heart failure, and at a significantly lower risk to have cardiac arrest [8,36]. The findings of this research endeavor have yet to be duplicated in the clinical setting, as is evidenced by a study published in the Mayo Clinic Proceedings in 2001 by Aviles and colleagues involving a double-blind study of intercessory prayer. In this study, a group of intercessors were assigned to pray for a specific patient at least once a week without the knowledge of the physician or patient [34]. With the promise of providing causation, an inherent weakness to the study is that the effect explored has no basis within the current scientific paradigm [35]. The results found no correlation between intercessory prayer and positive medical outcomes [34]. While seemingly in opposition to the connection of faith and health, this study dismisses the nature of psychosocial, behavioral, and physiological mechanisms that are known and accepted within the tradition of science [35]. The foundational elements of spiritual care involve a consistent belief structure that allows the coordination of expectations for the physician, patient, and spiritual community. The findings of the Aviles study conflict with both scientific and

scientific and theological perspectives of healing [35]. It is through the belief structure of the patient and the positive spiritual guidance of care providers that spirituality ushers psychological comfort and physical healing. This study, while gaining much public attention, actually contributes no information to the sound scientific determinations made by this and the incorporated studies. For it is through the well-established, natural mechanisms of psychological and physiological healing that the responsible application of faith in medicine is achieved. A second important aspect of spiritual care is that healing spans beyond physical rectification. A realistic respect for medical diagnostics is essential to the care for an individual and their supporting family and friends. By understanding the implications of illness, a bridled hope for miraculous physical healing provides clarity and understanding in the challenging circumstances of illness. This achievement fosters an enhanced perspective of understanding for the multifaceted healing that occurs prior to the last days of life.

Conclusions

"There is growing evidence that psychological stress and social factors including network diversity and perceived availability of social support influence immunity and immune system-mediated disease" [2]. It is through these factors that cellular and hormonal indicators of health provide scientific awareness for the effectiveness of spiritual care. The active participation of individuals in social networks of care provides promise for health prevention and recovery from disease [2]. A reliance on personal faith and the spiritual social support gained from religious communities provides individuals with buffering effects to the psychological and physiological challenges of stress. In the dynamic standards of faith and health, a respect for medical proficiency provides a

calibrated hope for miraculous physical healing. This perspective allows individuals and their family and friends to gain a multidimensional understanding of healing, providing comfort and assurance. The bigger picture provided by spirituality and religion guides the healing process, contributing to the achievement of psychological and physiological wellness potential.

Chapter Two: Immune and Neuroendocrine Relationships with Spirituality

"After decades of such militant reductionism, supplemented by the latest news in genetics, neurology, and endocrinology, the public at large is getting the sense that 'biochemistry governs all' and 'that we are all machines [constructed by natural selection to serve genetic self-interest], pushed and pulled by forces we can't discern but that science can'. In such a cultural climate, psychoneuroimmunology and research into the impact of religion on health might prove to be particularly attractive as a counterweight to such an extreme, mechanistic reductionalism, because it suggests a more complex understanding of the mind-body connection and grants to human longings for meaning, coherence, control, fellowship, and forgiveness a certain reality and significance that is scientifically demonstrable" [2,37].

The current interest in spiritual care application in medicine is catalyzed by a fascination with the aspects of life that are left unexplainable by scientific theory. As we take one final observance into the impact of religion and immune system functioning, it is with great discernment that sound scientific analysis provides natural mechanistic explanations to the seemingly undefined spiritual avenues of health. The studies of stress-induced immune alterations are in the early stages of development. However, it is through these studies on stress and health that an appreciation for the beneficial application of spiritual care is gained. Religiously involved persons have been found to have enhanced immune functioning, as mentioned earlier, as a result of a greater sense of optimistic expectation [38]. In the attempts to measure the incalculable commitments of individuals to their faith, it is more important to understand what kind of God one believes in (kind, loving, and merciful vs. distant, uninvolved, and punishing) than simply if one believes in God [2,39]. Three recommended scales of religiosity by Dr. Harold Koenig are the 10-item Hoge scale (1972), the 20-item Allport and Ross I-E scale (1967), and the 5-item Duke University Religion Index (DUREL) (1997) [2]. These measures capture organizational religiousness, nonorganizational religiousness, and intrinsic religiosity [2]. With the orchestration of these intrinsic and extrinsic measures of religiosity, an objective scale is achieved to which a correlation may be matched. It is important for the included measures to be used separately as predictors rather than

applying a combination of different dimensions [2]. This suggestion for analysis avoids multiple co-linearity by independent assessment of distinct variables of religiosity. The understanding of studies in immunology and endocrinology allow an enhanced perspective of the physiological changes imposed by neurological regulation by religious participation.

The pioneering Duke University studies mentioned in section three serve as the scientific foundation in current efforts to establish the impact of faith on immune system functioning. While seeking to gain definitive evidence in this study, Dr. Koenig and his colleagues measured several markers of inflammatory and immune responses. These measures included interleukin-6, fibrin d-dimers (involved with coagulation at lesion or trauma sites), alpha-1, alpha-2, beta and gamma globulins, lymphocytes, and neutrophils [8]. It was through this research that conclusions reflected favorable decreases in IL-6, alpha-2 globulin, lymphocytes, neutrophils, and increases in fibrin d-dimers for individuals in current patterns of religious involvement [23]. The additional factors of observation showed neither positive nor negative correlation with current religious practice [8]. This six-year study is the hallmark of scientific achievement in support of the role of faith in the biochemical modalities of the human body. The concluded "younger immune systems" in the elderly group of study supported consistent patterns of religious involvement in the determination of this favorable physiological state [8]. For those never or rarely attending religious practices, 15.7 percent had high IL-6 levels while only 8.8 percent were observed in the regular participants [23]. Those categorized as intermediate attendees produced 11 percent with the high IL-6 levels, representing a "dose effect" for the direct relationship between increasing religious participation and more favorable

measures of inflammatory markers [8,23]. This study created a great interest from the medical community for the application of spiritual care for those in need. This inspirational finding serves as the benchmark to the continuing research efforts that support the positive and direct relationship of religion and health.

The relaxation response, initially characterized by Dr. Herbert Benson of Harvard Medical School, elicits reduction in muscle tension, sympathetic nervous system activity of the autonomic nervous system, activity of the anterior pituitary-adrenocortical axis, blood pressure, heart rate, and oxygen consumption [2]. The psychological and physiological effects of the relaxation response correlate with changes in brain wave activity, wave functioning, and have been found to promote healing in the course of many acute and chronic illnesses [2]. This characteristic response is an integral component of meditation, Eastern-religion derived practices, and meditative prayer [2]. Meditative practices have been found to lower stress hormone levels, providing a favorable physiological environment for the healing process. Reviewed by Dr. Koenig, research by MacLean and colleagues in 1997 focused on the changes of four primary hormones- cortisol, growth hormone, thyroid-stimulating hormone, and testosterone- prior to and following four months of meditative stress control. The group trained in meditative practices had distinguished physiological changes from the control group, represented by a decrease in cortisol levels and an increase in the stress responsiveness of cortisol. The stress responsiveness for TSH, testosterone, and GH changed inversely for the two groups. These imposed physiological modifications in response to transcendental meditation support the theory that repeated practice reverses the arduous demands of

stress [2,39]. This release of anxiety and discomfort allows individuals to maintain ideal standards of physiological functioning.

Stress and Cancer: The Regulation of Natural Killer Cell Activity

The role of natural killer cell activity in the regulation of cancer prevention is a primary research interest for modern science. In 1993, research by Schedlowski, Jacobs, and colleagues focused on the physiological changes brought about in a first-time skydiving experience. This effort involved the continuous monitoring of plasma cortisol, catecholamines, natural killer cells, and antibody-dependent cellular cytotoxicity concentrations [40]. The significant research findings of this study reflected a dramatic increase in sympathetic-adrenal hormones during and shortly after jumping. There was a concomitant increase in lymphocyte subsets and NK cell "functional capacity" immediately after jumping. One hour following this activity, NK cell activity decreased to below the resting values before the jump [2, 40]. It was with these findings that a positive correlation of NK cell activity and noradrenaline plasma concentration was observed, with an increase in the NK cell mobilization serving as a major determinate of immune system adaptation to stressful life events [2]. This study of acute stress championed an interest in the relationship between stress and cancer through the mechanisms offered by natural killer cell activity.

A foundational study to the efforts in psychoneuroimmunology observed that undergraduate students experiencing life-change stress had higher levels of natural killer cell activity than those with less self-reported psychiatric challenges [41]. These chronic stress observations provided a more diverse understanding of the holistic needs of individuals experiencing psychological stress. The negative correlation between stress

and immune system functioning led to further research that concluded the effects of stress on cytokine production to be the cause of natural killer cell activity reduction [41]. The observance of this neuroimmunological relationship suggested increases in TNF-α and IL-1β production, decreases in IFNγ production, inhibition of MHC class I and II molecule expressions, and increases in β-endorphin secretion to be the cause of natural killer cell activity reduction [41]. These physiological changes are thought to induce decreases in immune system activity and an increased susceptibility to cancer [2]. Laboratory studies on animals have provided further insight into the inverse relationship of decreased NK cell activity and an increase in cancer cell metastases [42]. With this conclusion, human studies have produced the same conclusions when observing the inverse relationship between NK cell activity at diagnosis and the risk of recurrence or metastasis [43].

An ongoing study at Ohio State University is focusing on the effects of stress on the prognosis of breast cancer for post-surgery patients. This study, estimated to eventually include 235 patients, involves the psychological methods of coping with stress. The already promising results of the study show a correlation between higher stress levels and a weakened ability of the natural killer cells to surround the foreign cells [45]. Immune system modulators and gamma interferons were applied to the blood tests in observance of the decreased sensitivity of NK cells to activity modification for higher-stressed patients. A second important prognostic indicator observed was the reduction of blood lymphocyte effectiveness, involving a consistent lowering of T-cell responsiveness. Each of these factors is negatively correlated with the potential spread of cancer [45]. A second study on the relationship of religiosity and breast cancer prognosis

focused on 112 women with diagnosed metastatic breast cancer. This study concluded a positive correlation between religious expression and the total lymphocyte counts, natural killer cell numbers, and T-helper cell (CD4+) counts [46]. These promising findings encourage care that embraces the psychological needs of cancer patients upon diagnosis, allowing the promising application of spiritual care in oncology. By embracing the prevailing spiritual aspects of life, patients receive beneficial guidance in the management of psychological stress. While much research remains to be completed on the connection of faith and cancer prognosis, the early discoveries of many provide hope for the journey to come.

Spirituality and the HIV/AIDS Patient

"There is currently an urgent need for longitudinal studies to determine if people become more religious as a result of illness or if the people who are more religious are somehow protected from disease progression" [2]. The HIV/AIDS community has attracted the empathy and outreach of many religious efforts. It is through these efforts and the contributions of patients within the AIDS community that many have turned to religious coping measures to relieve the fears accompanying the struggles of this debilitating illness. In 1997, Evans and colleagues concentrated their efforts on 93 initially asymptomatic HIV-positive homosexual men by following the course of their illness for 42 months and monitoring the coordination of life stress measures with the progression of symptoms. Their conclusions of research, along with many others, observed a fourfold increase of illness progression with high ranking of life stress [47]. The vast amount of research efforts into the psychosocial and physiological factors of HIV and AIDS progression is immense. With a focused understanding of the impacts of life

stress on this immunodeficiency illness, many conclusions provide insight to other research efforts in the study of immunology. In research efforts concentrating on the coping strategies practiced by individuals with AIDS, active measures to gain greater self efficacy in their illness lead to a slowing of symptom progression [48]. This study by Ironside, Friedman, and colleagues studied patients in denial and disengagement upon diagnosis and their characteristic CD4 decline and lower T cell proliferation [48]. It is with great research and clinical trials that leading psychologists suggest the most effective coping strategy with HIV infection is "to avoid obsessive rumination with a healthy dose of distraction" [2]. In an 1998 study by Byrnes and colleagues, higher levels of pessimism in black women co-infected with human immunodeficiency virus type 1 and human papillomavirus present lower NK cell levels and fewer cytotoxic suppressor cells in the control of HPV [49]. The positive perspectives of HIV, AIDS, and HPV patients allow enhanced coping ability and greater responsiveness to medical guidance and treatments.

It is through recent research efforts on stress, coping, and spirituality that distinct measures of progress have been achieved in the treatment of individuals with HIV. A hallmark study in 1999 involved twenty-five interviewed men and women with nonprogressing HIV, diagnosed by being "HIV positive for 7 or more years, CD4 counts of at least 500/mm^3, and free from opportunistic infections and/or AIDS-defining illnesses" [2]. The focus of this research effort was to gain an understanding of common standards of life that promote a delayed state of HIV progression. Research conclusions observed a perspective of the virus as manageable, a value for relationships with others, appreciation for physical and mental health, and a commitment to spirituality [50].

Research reviews of this study point to the early commitment of these measures to allow the greatest effectiveness in the management of HIV.

The diverse manifestations of the HIV virus have led to a global epidemic that continues to gain great attention in medical research. As many biochemical avenues of treatment are exhausted, science points to psychological and social measures to control the nondiscriminating grasp of the AIDS virus. Magic Johnson, arguably the highest-profile societal figure to have HIV, claims that his newfound faith following diagnosis with HIV to be a great contributor to his positive outlook on life and his nonprogressive state of present illness. In his words, "I'm not cured, but I am healed." This profound statement revisits the holistic healing offered by spiritual care, progressing beyond physical boundaries of health and providing individuals with a greater sense of purpose and meaning in life [8]. The application of spiritual care in the treatment of AIDS provides an enhanced perspective in the treatment of all illnesses with an immunological basis. This holistic appreciation for the needs of all individuals carries a greater understanding of the human body and a hope for the physical, mental, and spiritual healing of all peoples.

Stress, Spirituality, and Autoimmune Disease

A remarkable volume of scientific research is devoted to the study of autoimmune disease and the stress response. In studies on humans and animals, an impaired stress response has been related to a heightened susceptibility to autoimmune disease [51]. Three hallmark studies additionally reviewed by Drs. Koenig and Cohen mark the standards of autoimmune disease characterization. Treatment of a strain of mice with cortisol receptor blockers increases the severity of autoimmune disease, whereas injections of cortisol

(responsible for secreting CRF) or the adrenal glands (responsible for secreting cortisol) from animals normally resistant to inflammatory disease induces an increased susceptibility to the ascribed conditions [2, 53]. The third study of interest consisted of an implantation of normal hypothalamic tissue into rats with diagnosed autoimmune disease. This procedure provided a decrease in the sensitivity to inflammation, directly representing a positive correlation of stress and the presentation of autoimmune disease [2, 54]. A predicted cause of this direct correlation, as noted by Drs. Koenig and Cohen, is the stress induced impairment of immune system regulation. This component of normal physiological functioning is present following the infection of tissue, and an "exposure of previously hidden tissue to the immune system results in the formation of autoantibodies that subsequently cross-react with normal healthy tissues" [2]. This group of studies provides a foundational understanding on the role of stress in the development and presentation of autoimmune disease. It is with this enhanced perspective that future endeavors seek to apply this understanding to the diverse array of autoimmune diseases present in the human population.

The body of research in the field of psychoneuroimmunology points to the stress response as a main determinate of immune system regulation. Research efforts on the relationship between spirituality and autoimmune disease are premature; however, foundational studies propose the incorporation of spiritual care in medicine as an effective mode of neuroimmunological regulation. A 1999 study by Dr. Dale Matthews and colleagues examined the effects of Christian intercessory prayer coordinated with medical care for rheumatoid arthritis patients. In the observed forty patients, a positive correlation was found in the patients of direct contact and spiritual participation with

intercessors. These subjects demonstrated distinguishing overall improvement, including reduction in the swelling of joints and tissues, less self-reported pain, and a decrease in functional impairment [55]. This promising discovery provides insight to the application of holistic spiritual care for individuals suffering from autoimmune disease. It is through this and further studies that researchers seek to gain a greater understanding of the human immune system response to spiritual care. With this holistic awareness and respect, the embrace of patient spirituality promises to serve as an avenue of diversion from the common patterns of the stress response. This favorable psychological response to care lessens the immune system deficiencies imposed by stress.

Conclusions

"In my endeavors, I have tried not to reduce God to neurons, but to heighten medical science's respect for all belief, including belief in God, so that we understand how remarkably powerful is the mind, body, and soul we inhabit" [3]. These words of Dr. Herbert Benson, president and founder of the Harvard Medical School Mind/Body Medical Institute, capture the essence of medicine and life. In this select group of studies concentrating on immune system mediated illnesses, promise is found in the lives of patients embracing their innate spiritual convictions. The field of medicine fosters a potential for care that supports these holistic needs of patients, inspiring their psychological and physiological healing. As the physical cures for these immune system illnesses continue to evade modern scientific prowess, it is vitally important to respect the healing offered by the caring hand of medicine and spirituality. The mechanisms presented support stress reduction as a primary determinate of patient prognosis. As many unanswered questions remain in the pathogenesis of these illnesses, perceptions of

spirituality and medicine inspire a higher quality of life for patients in need. It is through this healing that spirituality may provide medicine with one step closer to a cure.

Thoughts and Reflections

The promise and search of truth inspires a scientific mind and faithful spirit. The holistic disciplines of medicine provide guidance, support, and encouragement for those in need. As a medical missionary in the Amazon Region of Brazil, I have shared the sorrow of illness and the joy of healing. This opportunity has allowed me to share my talents in treatment of others, in contribution to the wonder of medicine. Transcending the barriers of language and culture, the hope of healing is shared in the mutual commitments of respect and trust. This model relationship between the patient and physician provides an optimal course of psychological and physiological development. My studies in spirituality and health have allowed me to serve the Knoxville community as a student hospital chaplain at the Baptist Hospital of East Tennessee. In my encounters with over seven-hundred patients and their families, I have witnessed the peace and comfort of faith in times of healing and loss. These life-defining moments have inspired my fascination for medicine and the relationship of the mind, body, and spirit. The perspective offered by this study inspires the continued study of the relationship of faith and health, while representing many gaps in the scientific research. With the continuation of these studies, commitment to a strong basis of control and relative measures of shared religiosity will provide a more accurate representation of the application of faith in medicine. It is through my ongoing studies in medicine that I hope to provide strength and clarity to the scientific foundations of faith and healing. As I continue to grow in understanding and proficiency, it is my desire to contribute my gifts so that others may achieve the abundant potential of life.

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