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**Editorial**

# The Healing Power of Being Seen: Understanding How Genuine Care Strengthens Human Connection

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Despite technological progress and a globalized world, modern life shows a puzzling contradiction: Never before have we been so connected, and – at the same time – never before have so many people reported feeling so profoundly alone and unseen. Even with countless ways to connect, we often fail to truly reach each other.

A simple phrase captures this reality: We are overconnected and underrelated.

It is not primarily – and this may come as a surprise – communication that we are lacking. It is real connection – the kind that touches us, shapes us, and anchors us.

The disconnection we are experiencing is not an abstract phenomenon. I regularly observe this dynamic in my work as a communication trainer, supporting leadership teams and organizations across industries. Teams and leaders often emphasize the importance of collaboration, shared goals, and building a strong sense of "we." They aim to foster cooperation, create team spirit, and build real togetherness. Yet despite these intentions, a different reality often emerges: employees frequently share that their leaders take too little time for their concerns, that genuine appreciation is rare, and that efforts to contribute or offer critical feedback are often discouraged rather than welcomed.

Gallup's State of the Global Workplace 2025 report confirms these patterns: only 21% of employees worldwide report feeling engaged in their work. The consequences are significant: disengaged employees are more likely to experience stress, emotional exhaustion, and a diminished sense of purpose. This disengagement does not only reduce performance; it weakens loyalty and increases feelings of isolation within organizations (Gallup, 2025).

Beyond the professional context, the human cost of disconnection is equally serious. The rise of loneliness even led the United Kingdom to establish a Ministry for Loneliness, recognizing that a lack of meaningful connection is not just a personal issue, but a public one – with serious effects on health and social cohesion (UK Government, 2018).

If communication alone is not enough, what is missing? It is the experience of being seen and valued – not for what we achieve, but for who we are.

This feeling, however, does not arise from words alone. It begins with an attitude, a conscious choice, expressing: "You matter enough for me to pause something else." It is a decision to slow down, to set aside distractions, and – to put it simply – to care about what another person cares about.

That includes lifting our eyes from our devices or current tasks and approaching another person with curiosity instead of judgment. It means listening not to confirm our assumptions, but to discover something we did not yet know.

The Latin root of the word respect – respicere, meaning "to see someone or to show consideration for someone" – captures this spirit perfectly.

We feel seen when someone genuinely takes interest in us – not only when we are useful to them, but when they want to know what moves us, worries us and excites us. This kind of attention costs time and energy – and in today's fast-paced world, many people feel they cannot afford to invest it. Partly because they are already overwhelmed by their own responsibilities. And partly because truly seeing another human being brings with it an emotional commitment. Once we have seen another person's burden, we cannot remain untouched. Seeing someone creates a form of responsibility. It asks not only for our time, but for our willingness to be affected. Sometimes we hesitate to ask deeper questions because we know that truly listening could make us witnesses to pain – or reveal that our support is needed.

Yet meaningful connection is exactly that: understanding what moves and matters to the other person. It often starts with simple questions: "How are you really?" "What has been on your mind lately?" "Is there something you wish others understood better about your situation?"

Such questions, especially "How are you?", are often asked out of habit – without any real expectation of a meaningful answer. Yet if we asked them with true openness, they could reveal so much about a person and open a door to real understanding. From what I have experienced, the best questions are often the simplest ones – asked with real intention rather than technique. Questions do not need to be sophisticated. What matters is the promise they carry: If I ask, I am willing to stay and listen.

What helps us in our efforts to build connection is that we must set aside our assumptions about what we ourselves would need in a specific situation. Respect means recognizing that the other person might need something very different – encouragement, patience, challenge or simply space. It is an expansion of the Golden Rule: while the original Golden Rule suggests treating others as we would want to be treated, real connection often requires more. It asks us to treat others as they need to be treated – even and especially if it differs from what we would wish for ourselves.

As already described, the quality of listening reveals itself not in words or phrases, but in the patience of our silence, the openness of our attitude, and the absence of rush.

In my work, I often encourage leaders to move away from complex communication strategies and to return to a simple, demanding practice: put the phone aside. Meet the other's gaze without hurry. Allow silence to exist, without immediately filling it. True listening is not about controlling a conversation. It is about slowing down enough to enter the rhythm of another person's experience.

The effects of listening are profound – and they can also be explained scientifically. When we are truly listened to, something transformative happens inside us. Our nervous system, often on guard in everyday interactions, shifts from defense to openness. Stephen Porges' Polyvagal Theory describes this beautifully: genuine social engagement activates the parts of our nervous system that promote safety, trust, and restoration (Porges, 2011). In these moments, we move from vigilance to resonance – from surviving to relating.

At its core, being seen and heard is therefore not a luxury, but a biological necessity – vital for emotional and physical health. Research by Cacioppo and Patrick (2008) further highlights that the human need for social connection is deeply rooted in our biology – essential for mental resilience and physical health. That is why we should not view it as a "nice-to-have," but as a foundational pillar of our relationships.

Small moments of genuine presence – a thoughtful question, a heartfelt hug, a shared smile – can profoundly alter the emotional climate between people. They build invisible bridges of trust that no team-building workshop or incentive program can manufacture.

True connection often remains invisible – living in the quiet spaces where someone chooses not to interrupt, not to fix, not to judge – but simply to be with another.

In a time of accelerating pace and constant distraction, such moments require deliberate effort and an inner conviction: nothing essential is lost when we slow down and make time for someone else. On the contrary: it is precisely in these moments of curiosity and openness toward another person that real connection is born.

These moments of true encounter must be consciously created. They arise in spaces we nurture with intention – between people willing to stay, even when it would be easier to move on.

Truly listening is one of the most important skills for creating real belonging and connection. A good listener transforms workplaces, families and communities. They enrich the lives around them – because after all:

The greatest present we can offer is being present.

It is not the frequency of our connections that binds us most deeply. It is our mutual willingness to remain curious, even – and especially – when we are different.

May this issue of THE MIND inspire you to listen beyond words and to rediscover the healing power of truly seeing – and being seen.

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Research

# The Coordinate System of Connectedness: Theoretical Framework

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**Abstract**

Connectedness is on everyone's lips — yet disconnection and loneliness seem more widespread than ever. Despite constant digital interaction, we often remain alone, disconnected from ourselves, others, and the world. This article introduces a three-dimensional model of connectedness: the generativity axis (past–future), the axis of presence (companions), and the vertical axis (earth–transcendence). These intersect in one's center, forming a personal coordinate system. Inspired by Buddhist practice and informed by Viktor Frankl's insights, this model offers a vivid, almost tangible way to reflect on connectedness.

**Keywords**: Coordinate System of Connectedness, measurement of connectedness, health promotion, mind-body medicine, theory

## Background

Connectedness seems to be on everyone's lips these days. What's more: Disconnection, loneliness, for example, seems to be rampant. We even hear about it in politics; even the new German government (2025) has taken up the issue.

Even though we are constantly interacting on social media today, seemingly connected to one another everywhere and at all times, we are mostly alone; we gaze lonely at our "screens". The people we see there are also all too often alone. This problem has been known for many years and was vividly described by Tristan Harris with the term "social dilemma" (2020).

We humans are cooperative, collaborative, we are there for one another and with one another. We are born for togetherness and connection. Not for isolation and opposition – this only happens in exceptional cases. The general rule is: We all need a home, the feeling of being at home, of being cared for, of having a place. Research clearly shows that people who lack this ability have a huge risk of dying earlier, suffering more heart attacks, strokes, depression, diabetes, and dementia (Holt-Lunstad et al. 2010; Holt-Lunstad et al. 2015; Holt-Lunstad 2021; Esch et al. 2024; Michaelsen und Esch 2023). Overall, the health risk from a lack of connection is at least as great as smoking (Holt-Lunstad et al. 2015). Some studies show that it even doubles mortality (Holt-Lunstad et al. 2010). But what exactly do we mean by connection? What specific dimensions exist, and how can they be measured and represented?

**Description**

Professionally, we distinguish between either three or five types: self-connectedness, social connectedness, and spiritual connectedness would be one classification. Here, some authors distinct between the self (inner world), the other (complement), and nature as a whole (environment or outer world) (e.g., Michaelsen 2021). Alternatively, the five-level framework: connection with myself, with one's direct counterpart, with one's immediate peer group, with society, with the universe or absolute.

As practitioners and interested readers of Buddhist texts, we came across a meditation or exercise a few years ago (see below: Practice) that has recently been incorporated into our professional assessment and analysis of connectedness. We attempted to translate these dimensions into a *three-dimensional coordinate system of connectedness*. Now, the connectedness — or lack of connectedness — suddenly became vivid, graphically representable.

Let's imagine we have axes and levels of connectedness within us. One level, the horizontal, essentially represents our relationships with people (or animals). One axis runs from back to front: Behind us would be the people who brought me up, perhaps my parents, teachers, and also role models, my "heroes". In front: those I brought up, who perhaps look up to me, my own children, students, people for whom I may be a role model. This axis can also be called the "generativity axis": it ultimately connects my ancestors and my descendants. In the middle: myself. How connected do I feel to these two groups?

Also on the horizontal (or social) plane, now on the lateral axis — from right to left or vice versa — we find people who are our companions, who walk with us through life in the here and now. This axis is thus the human presence, the "axis of presence". Again, the question: Who is there, who walks with me, who accompanies me? And how connected am I to them?

Then comes the vertical plane. Here, the central axis runs from the ground through me to the sky, or vice versa. The question: What is the ground on which I walk, on which I stand, the culture, the nature — we could also call it the "region". How connected am I to it, how "at home" am I in it? The invisible path runs upward through me and emerges again from a vertex — into the sky, into the universe, into the transcendent. What is "up there" for me? And how connected am I here? How located am I between "up there" and the earth "down there"? How centered am I between the two, and do I have good contact?

If you imagine these planes and axes visually, they ideally meet in your center. You could also imagine Leonardo da Vinci's famous illustration of Vitruvian Man: the person, in ideal proportions, with his arms and hands outstretched, forming a circle around himself. If this person also stretches his hands upward, or forwards and backwards in the same way, not just a circle but a sphere is created around him (Figure 1).

If I considered the axes and planes described above, would my sphere be round and uniformly shaped? Would its center truly be within me, within my core, perhaps in the area of my heart or not far below, in the "Dantian" or "Hara"? Or would it be shifted, even if only slightly — would I, in a sense, be living in the "neighborhood" of myself in terms of connectedness, not centered? And how would that feel?

*Isn't this perhaps a common problem — that we live everywhere, but not in connectedness, in our center, not completely at home in ourselves and in life?*

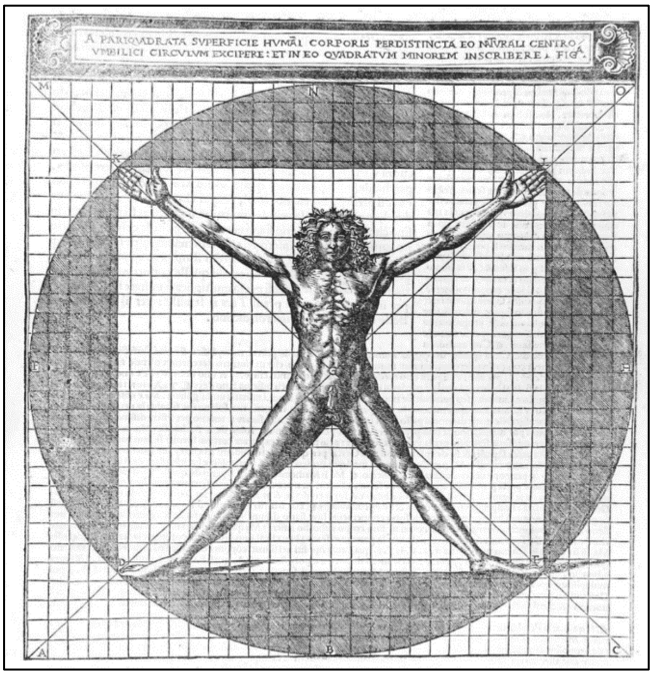


**Fig. 1: Cesare Cesariano Vitruvius grid organization.** Drawing is licensed under a Public Domain license.

We have currently begun research on precisely this question (and with this model). The first nearly 500 data sets are available. We are still in the evaluation phase, but what we can already see is that it's getting exciting.

Yet perhaps we don't even need scientific methods to sense and understand the essence of the described location of connectedness?

It is always astonishing how strikingly precisely the famous neurologist Viktor Frankl saw and described all of these things almost 100 years ago. This also includes his central theme regarding our "wandering through" the described axes and levels in the course of life (Esch 2023; Frankl 2023). Frankl stated that life passes through us; it always starts from the beginning (Frankl 2006; Esch 2023; Frankl 2023). In front is the young and fresh, behind us lies the past. We humans, however, are "masters of transience", as he called it: We have the ability to give our lives meaning simply by transcending life itself and ourselves within it. Our legacy is the manifestation of our meaning and our very existence: Like the hungry caterpillar, at the end, when we have worked our way through life, when our storehouse is full, we will have reaped the harvest, be transformed, and be able to (or must) let go — in order to ascend as a butterfly, so to speak, and leave this place behind. And so, the axis of the transcendent, the absolute, is always present in Frankl's work. Ultimately, this image may give us lightness and freedom.

In our personal experience, anyone who feels this freedom, who consciously allows life to flow through them while ultimately remaining centered within themselves, is unlikely to suffer from burnout. Frankl called it the "manager's disease" back in the first half of the last century. He also spoke of neuroses; today we might perhaps call it a "nervous breakdown" — a now outdated term. Yet all these descriptions ultimately express a curvature or imbalance, a shift in our coordinate system: the "spiritual-cultural" and "social" axes no longer meet in the middle.

**Technical Realization**

Coordinate system of connectedness = 3 axes/5 dimensions/2 levels:

I) Horizontal level (=social level)

a) Dorsal dimension (=sub-axis)

Who supports me and has "brought me forth" (ancestors, (grand)parents, teachers, mentors, role models)

b) Frontal dimension (=sub-axis)

Who I am a role model for, who I have supported and "brought forth" (descendants, (grand)children, students, mentees)

*=> dorsal and frontal dimensions/sub-axes together form the generativity line (=axis: past – future)*

c) Lateral dimension (axes, both sides)

Companions (partners, immediate peer group, close community: social relationships with whom a real exchange "at eye level" is experienced)

*=> the lateral axes together form the presence line (social present)*

II) Vertical level (=transcendental level)

d) Lower dimension (=sub-axis downwards)

The earth/ground on which I walk/stand (home, culture, nature: "region"; society/community-at-large = environment & environment)

e) Upper dimension (=sub-axis upwards)

The space above me ("heaven", universe; spirituality, transcendent or absolute space)

*=> Lower and upper dimensions/sub-axes together form the spirito-cultural line*

(Note: Nature – i.e., the concretely experienced relationship to nature – is implicitly contained in the term "culture" = integrated through the image of home or "region")

*=> These 5 dimensions or 3 main axes ideally meet in the center of the body (or not), i.e., the self-reference or omega point is the intersection of all resulting axes.*

The original questions of the Coordinate System of Connectedness (CSC) as developed by Tobias Esch are presented below (Box 1).

*Please read through the following statements and indicate how true each statement is for you!*

*Please rate from – to:*

*"not at all true for me"* ← *0 1 2 3 4 5* → *"very true for me"*

I feel connected to the older generation and my ancestors.

I feel connected to the younger generation and my descendants.

I feel connected to my generation and companions.

I feel connected to my region – to nature, the land and its people.

I feel connected to something "higher" or spiritual.

**Box 1: Original CSC questions as developed by Tobias Esch.**

Based on the ratings of each CSC item, an individual or sample description of the three-dimensional coordinate system of connectedness can be presented as in Figure 2 (empty), Figures 3a and 3b with exemplary data points for individuals with a tendency to feel more connected to the older generation and younger generation, respectively.

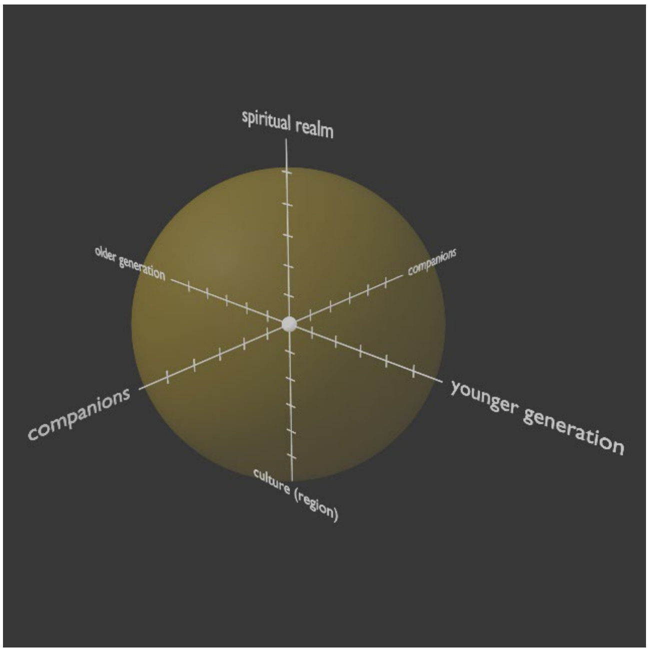


**Fig. 2: Coordinate System of Connectedness - 3D representation**; provided by Thomas Geib.

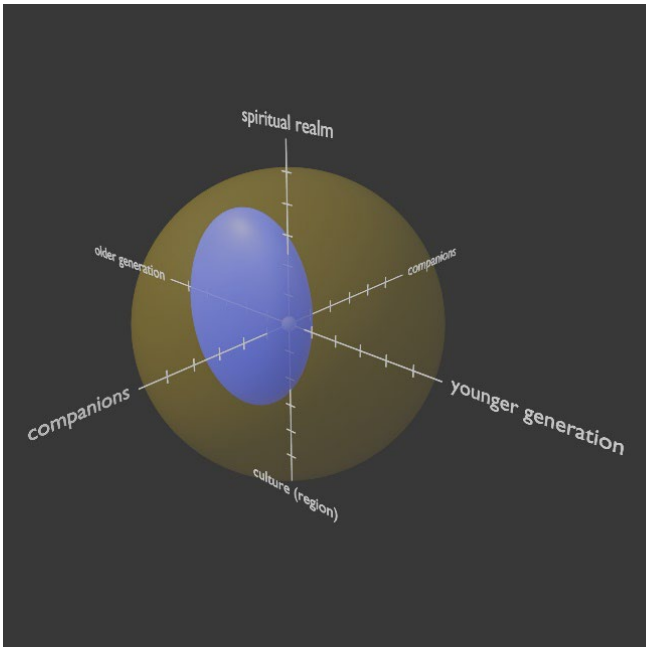


**Fig. 3a: Coordinate System of Connectedness - 3D representation with exemplary data points – tendency to feel more connected to older generation**; provided by Thomas Geib.

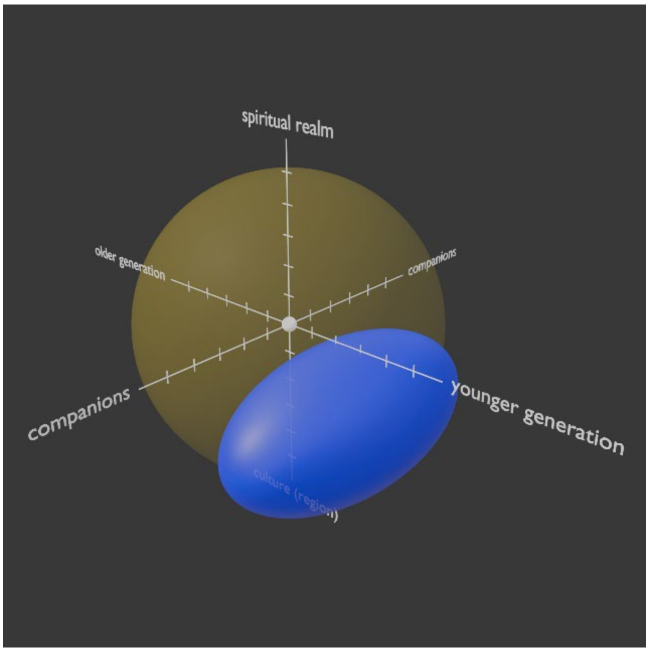


**Fig. 3b: Coordinate System of Connectedness - 3D representation with exemplary data points – tendency to feel more connected to younger generation**; provided by Thomas Geib.

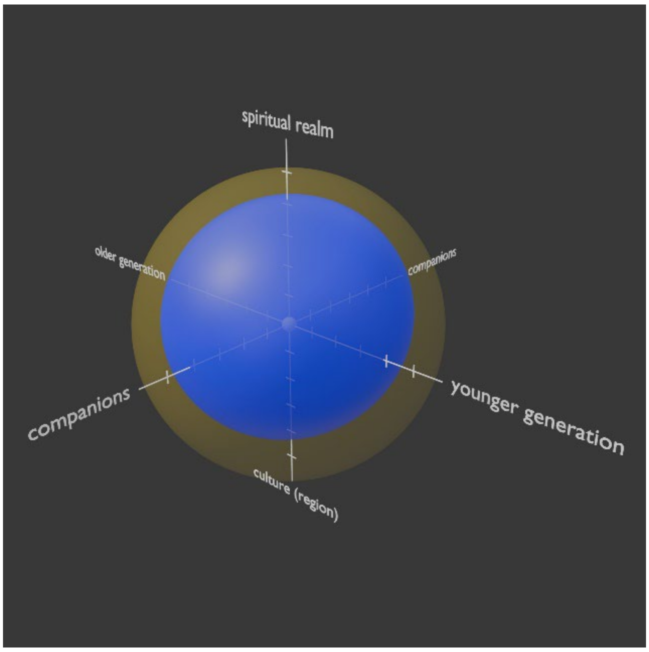


**Fig. 4: Coordinate System of Connectedness - 3D representation means of the coordinates of a survey with experienced mindfulness practitioners (Michaelsen et al., manuscript in preparation)**; provided by Thomas Geib.

Figure 4 represents the means of the coordinates of a survey with experienced mindfulness practitioners (Michaelsen et al., manuscript in preparation).

A practical guidance to experience and reflect upon the own dimensions of connectedness is presented in the exercise corner below (THE MIND, Issue 2025-2, p. 20).

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## The Pursuit of Happiness at the End of Life: Research on Connection, Care, and Meaning in Hospice Settings

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**Abstract**

This paper summarizes the extant research in the search and experience of happiness at the end of life. The present study draws on a range of research disciplines, including palliative care, psychology, sociology and philosophy, in order to examine how the concepts of connection, dignity and meaning coalesce into what might be termed 'happiness at the margins of life'.

**Keywords**: happiness, connection, well-being, death, end-of-life care

Earlier this year, I was invited by a children's hospice to deliver a speech on the topic of happiness. The invitation was accepted without hesitation. However, as the project progressed, a sense of uncertainty and apprehension began to emerge. The question therefore arises as to how one can discuss the concept of happiness in a context where young lives are characterized by suffering, severe illness, and, frequently, the proximity of death. Upon arrival, the initial feelings of uncertainty and anxiety were met with a sense of warmth and clarity. It became evident that the caregivers, parents, and, most notably, the children themselves, were eager to explore and articulate the concept of happiness within their respective contexts. During my visit, I personally observed a series of events that led to a significant shift in my perspective. It was observed that children with minimal physical capabilities, many of whom were non-verbal and unable to ambulate, exhibited a palpable sense of contentment. Parents and care professionals were observed to demonstrate an unwavering commitment to fostering connections, capturing moments of aesthetic appeal, and cultivating a sense of contentment among those in their care. This dedication, evident in their actions, serves as a testament to their navigation of grief and the challenges associated with profound exhaustion.

### 1. Happiness at the End of Life – Beyond Hedonism towards Connectedness

Empirical research in psychology and the social sciences conceptualizes happiness in terms of subjective well-being (Diener et al., 1999, 2018), often measured as a combination of life satisfaction, positive affect, and the absence of negative affect. The emotional part of happiness is a short-lived and changing response to immediate experiences. Life satisfaction refers to a cognitive, longer-term evaluation of one's life. Both aspects of subjective well-being are not identical but highly correlated (Kuppens et al., 2008). And both aspects rest on the assumption and empirical evidence that the pursuit of happiness is universal and that people are fully aware of their experienced happiness (Veenhoven, 2010). This is why most researchers use questionnaires.

However, surveys fall short in the context of severe illness and dying. Although there is "no consensus nor a gold standard diagnostic marker" (Carr & Luth, 2019, p. 519) for the end-of-life-phase, it is clear that more and more people will no longer be able to answer a questionnaire as they approach death. Data on the wellbeing of the dying often comes from family members or other members from the social support network. This is more than a measurement problem. To connect with the dying demands both new ways to collect information and a new understanding of the importance of connectedness for subjective well-being at the end of life.

## 2. Three Layers of Connection

End-of-life happiness is associated with different ways to connect with the physical, social, and transcendental environment.

### 2.1. The Body

Even as illness and physical decline progress, the body remains a critical medium for connection. Avoiding pain and breathlessness and being kept clean are the most important preferences of patients and caring family members at the end of life. Effective medication and dignified and careful personal hygiene are at the center of palliative care and strong determinants of end-of-life happiness. Still, these goals are not satisfactorily met (Carr & Luth, 2019; Greco et al., 2014; Johansson et al., 2024; WHO, 2023).

The steep decline in happiness at the end of life (Gerstorf et al., 2018) is also reflected in mental disorders from which many terminally ill patients suffer. 66% of palliative care patients report depressive feelings, and 20% experience severe anxiety, highlighting the need for psychological support and connection (Ann-Yi & Bruera, 2022).

One particularly powerful expression of connection is touch. As Montagu (1986) argued, touch is the first language we learn and one that retains its meaning even when other senses or capacities fade. A Swedish study of palliative care patients revealed that touch and non-verbal communication (e.g., eye contact, rhythmic movements) foster well-being particularly when verbal capacities decline (Håkanson & Öhlén, 2016). Touch is a gesture of recognition and appreciation from others and connects the dying person to their social environment.

### 2.2. The People

Social connections are inevitable for a happy end of life. Both hospice patients and terminally ill individuals emphasize the importance of relationships and social support over material wealth or achievements (Beng et al., 2022; O'Callaghan et al., 2021).

Befriending services enable both patients and their carers to participate socially and significantly improve emotional and psychological wellbeing by reducing feelings of isolation and loneliness (Gardiner & Barnes, 2016). Social connections in hospice settings are prioritized in ways that are structurally and ethically different from acute medical care and this can be uniquely transformative for patients, but also for carers and volunteers. As a Dutch case study from 2024 shows, sharing wellbeing through joint activities, legacy creation, and purpose enhances wellbeing for all (Olsman & Versteeg, 2024).

To be clear, receiving and providing care is emotionally taxing (Gómez-Urquiza et al., 2020; Kamal et al., 2020). But small pleasures like preparing and eating enjoyable food or shared moments of happiness like organizing social activities are described by the entire 'caring community' as enjoyable, meaningful, and rewarding.

### 2.3. Transcendence

Living a meaningful life connects everybody to a transcendent order that is greater than the individual limited existence. This layer of happiness refers to

Aristotle's idea of eudaimonia, the good ("eu") life and ethical spirit ("daimon"), or what Erik Allardt (1993) called the being of human happiness. "Being stands for the need for integration into society and to live in harmony with nature." (Allardt, 1993, p. 91).

Numerous studies have confirmed that religious beliefs and particular practices contribute significantly to people's subjective well-being (Levin et al., 2025; Lewis & Cruise, 2006). This is also true for terminally ill patients and their caring community (Austin et al., 2025).

Spiritual well-being is not confined to religiousness in a narrow sense. Working on one's life story to affirm legacy and purpose also brings connectedness and happiness (Liefbroer et al., 2025; Potter et al., 2024). Evidence shows that art therapies (Collette et al., 2021) and music interventions (Gillespie et al., 2024) connect to a grander context of beauty and meaning. They also provide a pleasant distraction and moments of shared joy. This is also true for experiencing nature, and animals at the end of life (Fegg et al., 2010; Tomás-Sábado et al., 2015). Other transcendent experiences like moments of awe or deathbed visions seem to reduce stress and anxiety (Claxton-Oldfield, 2024) and comfort (Broadhurst & Harrington, 2016).

These findings are not unexpected. The degree of happiness experienced by an individual throughout their life course is influenced by a number of factors, though these factors exhibit variations in their relative importance over time and between different individuals. The pursuit of happiness is the unifying factor in this concept. The existence of physical limitations is a fundamental factor that creates a clear divide between human beings. This is precisely where future research on end-of-life happiness must commence.

### 3. Future Connections

Most cited studies are dependent on questionnaire data, the accuracy of which is known to decrease in proportion to the proximity of the patient to death. In order to facilitate ongoing connectivity and the collection of valid and reliable information, it is imperative that future research integrates visual, audio, and other data to obtain a comprehensive patient-sensitive picture.

Despite the absence of definitive knowledge regarding the onset of the end-of-life period, the period leading up to death is commonly characterized by one or more chronic illnesses in contemporary societies (Carr & Luth, 2019). The management of chronic illnesses is predicated on the timely execution of appropriate decisions. The development of enhanced prognostic models, founded on causal designs and derived from precise and extensive data sets, holds the potential to provide patients and their care networks with enhanced information, advanced planning, and, consequently, greater control over their quality of life in the final stages of life.

In accordance with valid models of end-of-life happiness, interventions could become more tailormade, context sensitive and resource-saving. The "low tech high touch" approach to palliative care can be effectively recalibrated with the implementation of smarter technologies (Finucane et al., 2021). It is evident that young patients are trendsetters in the field of digital aids, ranging from chatbots to wearables. These technologies have the potential to enhance well-being by creating new, immersive, and entertaining experiences or by enabling patients to remain at home, given that health parameters can be remotely monitored in real-time. The integration of smart technologies and artificial intelligence has the potential to alleviate concerns associated with overburdening loved ones, protracted waiting times for professional assistance, information insecurity, and the experience of boredom.

This combination of factors has the potential to engender a novel sense of autonomy, efficacy, and interconnectedness among individuals confronted with terminal illness, despite the presence of significant limitations. The visit to the children's hospice revealed a notable absence of fear and presence of curiosity in the young patients, which has led to the formulation of an optimistic hypothesis concerning a shift in perspective on happiness, extending beyond the scope of end-of-life care. The prevailing scientific consensus on happiness requires both research and industry to now deliver both more accurate insights and smart devices and services

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# AI-supported Digital *OpenNotes* in Primary Care Setting

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**Abstract**

In primary care, time constraints and communication challenges can hinder patient understanding and treatment adherence. *OpenNotes* promotes transparency and improves patient engagement, health literacy, and self-efficacy by allowing patients to access their clinical notes. Patients are increasingly using artificial intelligence (AI) — particularly large language models (LLM) — to help interpret these notes. Moreover, LLMs offer support for physicians by assisting with patient portal communication. However, there are risks of inappropriate or inconsistent responses. Therefore, further research is needed to explore the safe and effective application of AI in the primary care setting.

**Keywords**: *OpenNotes*, primary care, artificial intelligence, patient activation, patient safety

**Challenges in Primary Care**

Primary care is characterized by a high number of patients and time constraints. On average, physicians have only a few minutes per consultation (Irving et al., 2017). This limited timeframe poses particular challenges in ensuring patient comprehension and prescribing appropriate medication, especially in cases involving complex medical conditions or patients with specific support needs, such as individuals with a migration background or from socioeconomically disadvantaged groups (Neprash et al., 2023). Knowledge gaps can be dangerous when it comes to medication-related side effects. They can lead not only to non-adherence but also to economic and personal costs (Sieling et al., 2025).

To ensure adherence to medical regimens, patients have to be able to recall treatment-related information provided during appointments. However, patients recall fewer than half of all recommendations made by healthcare professionals, while 15% of patients report having no recollection or incorrect memory of the information provided to them (Laws et al., 2018). Patients' level of education influences their ability to recall information accurately. Patients without a high school degree recalled only 38% of the information from their visits, while individuals with a college degree could recall 65% correctly (Laws et al., 2018). Furthermore, language barriers can contribute to miscommunication in clinical settings (Neprash et al., 2023).

***OpenNotes*: Digital Access to Clinical Notes**

*OpenNotes*, i.e., the sharing of clinical notes with patients, has the potential to mitigate such risks (Esch et al., 2016). Since mid-January 2025, the electronic health record (ePA) has been introduced in selected model regions in Germany, allowing patients to access medication plans, laboratory results, and medical reports (BMG, 2025). However, clinical notes — such as documentation of anamnesis, treatment preferences, and agreements made during consultations — are not included in the ePA (BMG, 2025). The sharing of precisely these types of notes is at the core of the *OpenNotes* concept, which originated in the United States. *OpenNotes* has been integrated into the medical care system in the U.S.; since 2021, as all healthcare institutions are now required to share clinical notes electronically and free of charge with their patients (Salmi et al., 2021). In Germany, a transparent handling of clinical notes has not yet been established (Esch, 2021).

**Pilot project at University Outpatient Clinic for Integrative Health Care and Naturopathy Witten**

Germany's first *OpenNotes* pilot project was launched in early 2019 under the leadership of Tobias Esch at the University Outpatient Clinic for Integrative Health

Care and Naturopathy (UnIG) in Witten. At the clinic, treatment reports and clinical notes are shared fully, transparently, and in real time with patients via a digital patient portal. Patients can view and download their records online at any time (Esch, 2021; Grote-Westrick & Münch, 2020). Patients report that access to these notes facilitates their preparation for medical consultations, enables them to ask follow-up questions and request corrections, and provides them with a sense of informational self-determination. Many patients state that they feel so well informed through this approach that they no longer rely on internet searches or “Dr. Google” (Grote-Westrick & Münch, 2020).

**Data on *OpenNotes***

Empirical studies on the use of *OpenNotes* show positive outcomes for patients, including increased adherence to treatment plans, improved understanding of personal health, enhanced self-efficacy, higher motivation to improve one's health, increased patient engagement and activation, and greater involvement in treatment decisions (Delbanco et al., 2012; Esch et al., 2016; Wright et al., 2015; Schwarz et al., 2024).

Physicians in Germany recognize the potential benefits of implementing *OpenNotes*. These include improved quality of documentation, enhanced patient involvement through increased health literacy, greater self-reflection among healthcare providers, and a reduction in the traditional power imbalance between doctors and patients (Schwarz et al., 2024). In a primary care setting, *OpenNotes* has the potential to empower patients through greater transparency, improve the physician–patient relationship and trust, reduce physicians’ workload (Grote-Westrick & Münch, 2020), and enhance healthcare delivery and outcomes (Wright et al., 2015).

The increased transparency associated with *OpenNotes* can facilitate a more equal and collaborative relationship between healthcare providers and patients, with the latter being integrated as active participants in the care team (Esch, 2024). Furthermore, a correction of documentation and medication intake errors contributed to improvements in patient and treatment safety, as well as in clinical outcomes (Wright et al., 2015).

Patients with lower educational levels benefit from access to clinical notes, reporting improved medication adherence and more effective collaboration with their healthcare providers (Bell et al., 2021). Older adults with multiple chronic conditions have also reported improved understanding of their treatment plans and better medication adherence because of *OpenNotes* (DesRoches et al., 2021).

**Artificial intelligence as a tool for patient–physician communication**

Access to clinical notes can promote active involvement in health promotion and prevention efforts, while also enhancing self-efficacy and patient activation. As a result of *OpenNotes*, patients ask more informed questions; however, confusion from patients about the content and meaning of clinical notes still persists (Salmi et al., 2025). If clinical notes are not understood, patients may use large language models like ChatGPT, Claude or Gemini to help interpret their medical information (Salmi et al., 2025). Physicians receive a growing number of messages through patient portals. Time constraints, combined with the inappropriate content of some messages, can negatively affect physicians’ mental health (Salmi et al., 2025).

The documentation burden on physicians is already high and can contribute to physician burnout (Gunderman & Lynch, 2018). Messages from patients received through the platform further add to physicians' workload, thereby increasing the risk of burnout (Salmi et al., 2025). Moreover, studies have shown that physician stress and burnout can lead to medical errors (Gaffney et al., 2019; Werdecker/Esch, 2021; Yates et al., 2020). LLM chatbots can assist healthcare professionals in responding to patient portal messages and help reduce their workload and mental burden (Salmi et al., 2025).

Despite some benefits, there are risks and ethical questions involved when integrating AI use in treatment processes (Baxter et al., 2022; Hallowell et al., 2022). For example, one study showed that clinical recommendations provided by the AI differed from those given by physicians, were sometimes inconsistent, and occasionally included potentially escalating advice — such as suggesting that patients report complaints to the medical board (Baxter et al., 2024). Moreover, the LLM occasionally provided medical advice, even though it was not intended to do so (Baxter et al., 2024). The quality of the LLM response depends also on the prompt and on the model.

Therefore, AI is more feasible as an assistant than as an autonomous chatbot. To meet further challenges more research is needed.

**Conclusion and Outlook**

In addition to the promising *OpenNotes* approach, artificial intelligence (AI) offers potential solutions to challenges such as time constraints and difficulties in patient understanding. The use of artificial intelligence in healthcare — particularly in primary care — is an emerging field of research with many unanswered questions.

To address these questions, a research alliance was formed by Institute for Integrative Health Care and Health Promotion (IGVF) at University of Witten/Herdecke, Hasso Plattner Institute (HPI), Oncare GmbH, Sonia Solutions GmbH, and Institute for Consulting, Research and Development in Dentistry and Medicine

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**Commentary**

## AlphaFold 2: Insights and Future Directions in Psychiatry

by Pascal Büttiker[1], Simon Weissenberger[1,2], Martin Anders[1], Jiri Raboch[1], George B. Stefano[1], and Amira Boukherissa[3,4]

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**Abstract**

The intricate links between protein misfolding and psychiatric disorders have drawn increasing attention in recent years. Several published studies have highlighted the contributions of misfolded proteins to the pathophysiology of conditions that include schizophrenia, depression, Alzheimer's disease, and prion diseases. Recent breakthroughs in computational approaches, exemplified by the artificial intelligence application AlphaFold 2, have enabled us to predict protein structures with remarkable precision, resulting in unprecedented insights into the molecular mechanisms driving psychiatric illnesses. However, challenges remain in the application of computational power and its accuracy, particularly given the unrealized potential of quantum computing (QC). This commentary examines current advances in protein-folding and its impact on psychiatric research, addresses several of the ongoing challenges, and discusses the future promise of QC for deepening our understanding and advancing the treatment of neuropsychiatric disorders.

**Keywords:** bioinformatics, AlphaFold2 (AF2), psychiatry, quantum computing (QC)

Proteins play critical roles in normal cellular functions and maintain specific structures that define their individual roles in biological processes. Misfolded proteins have been linked to several well-known psychiatric and neurodegenerative disorders. To address these concerns, we need to improve our collective understanding of both normal and dysregulated protein folding (Ciechanover & Kwon, 2015; Stefano, Büttiker, Weissenberger, Anders, et al., 2023). Traditional methods used to elucidate protein structure such as X-ray crystallography and nuclear magnetic resonance are time-consuming and costly. The AlphaFold 2 (AF2) artificial intelligence (AI) application developed by DeepMind (Alphabet) has revolutionized the prediction of highly accurate protein structures, thereby accelerating disease research (Borkakoti & Thornton, 2023; Büttiker et al., 2024; Jumper et al., 2021; McDonough, 2024). Despite these advantages, AF2 is not fully capable of capturing complex folding patterns and interactions within the dynamic environment of the brain. Emerging quantum computing (QC) methods offer potential solutions with faster calculations and advanced modeling capabilities (Stefano, 2024).

## The Impact of AF2 on Psychiatric Research

AF2 has revolutionized computational biology and has provided accurate predictions of thousands of protein structures, making protein structure determinations more accessible to the medical research community (Varadi et al., 2022). Researchers have applied AF2 to elucidate the structures of proteins involved in neurotransmission, synaptic plasticity, and neuronal development, all critical pathways implicated in psychiatric conditions, notably schizophrenia and bipolar disorder (Büttiker et al., 2024; Stefano, Büttiker, Weissenberger, Esch, et al., 2023). We surmise that the new-found capacity to model proteins previously designated as difficult to characterize will help researchers identify novel therapeutic targets for these disorders. AF2-based strategies may also be used to identify targets that may respond to lifestyle modifications that can be addressed as a means to prevent a given psychiatric manifestation, e.g., targeting neurobiological systems associated with motivation and reward (Michaelsen & Esch, 2023). Despite these remarkable achievements, several limitations remain. While AF2 is highly effective at predicting static structures, structural analyses of complex dynamic protein-protein interactions and post-translational modifications remain challenging (Gomes et al., 2022). The AF2 program in its current form does not intrinsically account for the cellular environmental factors (pH, temperature, ion concentrations, and/or micro- and macro-environmental thermodynamics) that critically influence protein folding in the brain (Guo et al., 2022). Many proteins involved in neuronal signaling and that have been implicated in one or more psychiatric disorders undergo constant conformational changes. These changes are challenging to predict using current computational models.

## Protein Folding Challenge

It is important to recognize that protein folding is a quantum mechanical process, involving atomic interactions that classical and current computing strategies cannot yet simulate efficiently. Based on fundamental units known as qubits and the capacity to leverage superposition and entanglement, QC can transform our approach to this problem by processing vast numbers of configurations simultaneously, thereby providing more accurate simulations of protein folding pathways (Stefano, 2023, 2024). QC-based algorithms have the potential to model misfolded proteins linked to the pathogenesis of Alzheimer's (e.g., amyloid-beta, tau), Parkinson's (alpha-synuclein), and prion-associated diseases (Stefano, Büttiker, Weissenberger, Anders et al., 2023) and thus provide a more in-depth understanding of these disorders. Additionally, the use of QC-based algorithms may lead to improved insights into protein-drug complex stability, thereby supporting drug discovery efforts aimed at targets associated with psychiatric and neurodegenerative conditions.

**Limitations of AF2-based QC**

Although QC is clearly a promising advance, it remains in its infancy. Current quantum computers, including those from IBM and Google, are limited by the number of stable qubits and are affected by "quantum noise"; these factors reduce the reliability of the calculations performed and thus restrict the complexity of proteins that can be simulated (Shaib et al., 2023). Developing quantum algorithms that accurately predict protein folding also remains challenging and requires expertise in both quantum physics and molecular biology. Additionally, because quantum systems must be maintained at temperatures near absolute zero (-273.15 °C), the infrastructure needed to support these efforts is both costly and energy-intensive. While widespread use of QC in psychiatric research may be a decade or more away, current advances in error correction, qubit stability, and computational power suggest these limitations might be overcome in due course.

**Future**

We further surmise that advances in QC, when integrated with AI programs such as AF2, will greatly improve protein folding predictions, particularly those involved in dynamic interactions that are relevant to psychiatric disorders. Hybrid models that combine classical and QC may leverage the strengths of both frameworks and facilitate more rapid and accurate simulations of large protein complexes. Both current and future applications of AF2 will advance psychiatric research because of its accessibility and effective structural predictions. Enhanced machine learning techniques and the availability of advanced computational resources will lead to further improvements in predictions of dynamic interactions and post-translational protein modifications. Close collaboration between computational biologists, quantum physicists, and mental health experts will be the key to advancing this interdisciplinary field. Cross-disciplinary training and targeted research funding are vital to equip researchers with the skills needed to face these challenges. As these technologies converge, the ultimate goal will be to translate molecular insights into therapeutic strategies that will enhance the prevention, diagnosis, and treatment of psychiatric and neurodegenerative disorders.

**Conclusion**

The convergence of psychiatric research, AI-driven protein structure prediction, and QC offers the promise of advanced understanding and the development of novel targets and eventually treatments for a wide array of neuropsychiatric conditions. While AF2 provides accurate structural information and thus has expanded protein research, QC might be used to address current limitations in molecular simulation as the field matures. The integration of these two important advances may yield groundbreaking insights into the molecular basis of neurocognitive disorders and lead to new protein-targeted therapies. Importantly, QC has the potential to create genetic sequences directing associated gene expression, which will prove to be very useful in gene therapies.

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Conflict of Interest: The authors declare that they have no competing interests.

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### Exercise Corner

## Coordination System of Connectedness - Practice

by Tobias Esch[1]

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In this exercise, I want to engage your imagination, or more specifically, your ability to visualize your body and its connection to other people and places. You decide whether you want to sit or lie down, and keep your eyes open or closed.

• First, imagine the back of your body: What does your back look like right now? And how does it feel? Can you imagine who is supporting you right now? Remember who has done this in the past? Think, for example, of your parents, grandparents, or even people who may no longer be here; friends, teachers, mentors, supporters, and role models. To whom do you owe the fact that you are here today and, in a positive sense, that you have become what you are now? Who do you look up to, whom do you admire, who have you learned from? Who is or was behind you? Who can or could you rely on?

• Now let's move to the front of your body: Who is walking in front of you? Who are you supporting and protecting? For whom are you organizing or opening paths? Who do you give concrete support to? Who do you back? To whom are you a mentor or role model, for whom are you perhaps even a hero? Think also of your own children or grandchildren, younger colleagues, etc. – who seeks advice from you, looks up to you?

• Now it's the turn of the sides of your body, your flanks: Who walks to your right and left? Who are your immediate companions? With whom are you at eye level? With whom are you possibly holding hands? Think of your partner, siblings, colleagues, and your circle of friends.

• Now imagine your feet or specifically feel the contact of your soles with the ground: What are you standing on? On what kind of ground, what country are you walking? In which homeland and culture do you move? What gives you firm support? What grounds you, what can you build on? Perhaps: What is familiar to you, what specifically defines your home? Where do you feel embedded, cozy, protected?

• Finally: Feel the crown of your head, the end of your body, in the expanse above your head. To whom or what do you feel connected "upwards"? Who or what is above you? What might connect you to the greater whole? Also: Who or what gives your life meaning? What inspires, energizes, or excites you? Is there something absolute or transcendent in your life – from your own personal perspective?

### Announcement

## MBMRC Guest Lecture with Michelle L. Dossett M.D., Ph.D., M.P.H. on August 27st online and at Witten/Herdecke University, 15:00h – 16:15h (CET)

[1]Devision of General Medicine, UC Davis Health, University of Carlifornia, USA

We are excited to present the next speaker in our growing hybrid lecture series.

Happily, we welcome Michelle L. Dossett from the University of Carlifornia, USA, as speaker for the MBMRC Guest Lectures on August 27st 2025, hosted by the Institute of Integrative Health Care and Health Promotion (IGVF).

Title: **Mind-Body Skills Training to Improve Clinician Well-Being: Results from the Stress Management and Resiliency Training (SMART) Program**

Time: 15:00h – 16:15h (CET)

Join online: Zoom-Link
Join on-site: Room 1.151 senat hall (Senatsraum), Witten/Herdecke University, Alfred-Herrhausen-Straße 50, D-58448 Witten

The participation will be free of charge.

The lecture will be followed by an open Q&A.

***For further information, please** click here*.

We invite all interested participants – students, researchers, and members of the public – to join us for this event!

Additional dates of the guest lectures are

**19th November 2025**

## The Mind-Body Medicine Research Council (MBMRC)

**At the present time, the council consists of the following members:**
Tobias Esch, M.D. (Co-Chair) – Witten/Herdecke University
George B. Stefano, Ph.D. (Co-Chair) – Charles University, Prague/ Witten/Herdecke University
Maren M. Michaelsen, Dr. rer. oec. Dr. rer. medic. (Project Lead) – Witten/Herdecke University
Christoph Stueckle, M.D. – Niles-Stensen-Kliniken Osnabrueck
Pascal Büttiker, M.Sc. – Charles University, Prague

**How to become a member of MBMRC**
As the MBMRC has been founded in 2022, and due to its dedication to rigorous contributions on the basic research foundations of Mind-Body Medicine, the number of members is yet small. In the future, the council aims to invite outstanding researchers in the field to become MBMRC members. Membership implies no fee.

## Recent Publications of MBMRC Members

Stefano, G. B., Buttiker, P., Michaelsen, M. M., & Esch, T. (2025). The anatomical and evolutionary impact of pain, pleasure, motivation, and cognition: Integrating energy metabolism and the mind–body BERN (Behavior, Exercise, Relaxation, and Nutrition) framework. *International Journal of Molecular Sciences, 26*(12), 5491. https://doi.org/10.3390/ijms26125491