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Beyond Privacy: Rethinking Neurotechnology Governance under Article 21 and India's Digital Personal Data Protection Act 2023

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Rapid developments in neurotechnology have transformed the relationship between law, privacy and the human mind. Technologies capable of recording and interpreting neural activity have generated renewed debates concerning neurorights, including mental privacy, cognitive liberty, mental integrity and psychological continuity. While several jurisdictions have explored constitutional or statutory recognition of these rights, the suitability of such an approach for India remains uncertain. This article examines whether India's existing constitutional framework, particularly Article 21, adequately protects the interests underlying proposed neurorights. Through an analysis of constitutional jurisprudence, the Digital Personal Data Protection Act 2023 and comparative developments in Chile, Colorado, the OECD and UNESCO, the article argues that India does not presently require separate constitutional neurorights. Instead, the principal challenge lies in the absence of a specialised regulatory framework governing neurotechnology and neural data. It concludes by proposing a governance framework that combines constitutional protections with targeted statutory reform, enhanced consent standards and institutional oversight to ensure that technological innovation develops consistently with human dignity, privacy and autonomy.

Keywords: neurotechnology, neural data, data protection, mental privacy, neurotechnology governance.

INTRODUCTION

For much of human history, the law has protected the body, property and personal liberty, while the human mind remained beyond the reach of legal regulation. Thoughts, memories and emotions were regarded as inherently private because no technology existed that could access or influence them. That assumption is no longer absolute. Rapid advances in neuroscience have led to the development of technologies capable of recording, analysing and, in certain circumstances, influencing neural activity.¹ What was once the subject of speculative fiction has gradually become a legal reality.

Neurotechnology refers to technologies that interact directly with the human nervous system for purposes such as monitoring, interpreting or modifying brain activity. Although these technologies have primarily been developed for therapeutic purposes, including the treatment of neurological disorders and physical disabilities, their applications are expanding far beyond clinical settings. Brain-computer interfaces, wearable electroencephalography devices and artificial intelligence systems capable of analysing neural signals are increasingly entering commercial markets, educational institutions and workplaces.² This expansion has created new opportunities for scientific progress while simultaneously exposing individuals to risks that traditional privacy laws were never designed to address.

Unlike conventional personal data, neural data has the potential to reveal highly intimate information about an individual's cognitive processes, emotional responses, preferences and intentions. The possibility that such information could be collected, processed or commercially exploited has raised fundamental questions concerning privacy, autonomy and human dignity. Consequently, scholars have argued that existing legal protections may no longer be sufficient to safeguard individuals against the unique risks posed by neurotechnology.³

¹ *Recommendation of the Council on Responsible Innovation in Neurotechnology* (OECD Legal Instruments, 2019); Nita A Farahany, *The Battle for Your Brain: DEFENDING THE RIGHT TO THINK FREELY IN THE AGE OF NEUROTECHNOLOGY* (St Martin's Press 2023)

² *Recommendation on the Ethics of Neurotechnology* (UNESCO, 2025)

³ Marcello Ienca and Roberto Andorno, 'Towards new human rights in the age of neuroscience and neurotechnology' (2017) 13 *Life Sciences, Society and Policy* <<https://link.springer.com/article/10.1186/s40504-017-0050-1>> accessed 10 June 2026

This debate has led to the emergence of the concept of *neurorights*. In 2017, Marcello Ienca and Roberto Andorno proposed that developments in neuroscience warranted the recognition of specific legal protections for cognitive liberty, mental privacy, mental integrity and psychological continuity. Their proposal has since shaped international discussions on neurotechnology governance and has influenced policy initiatives undertaken by organisations such as the OECD and UNESCO, as well as legislative developments in jurisdictions including Chile.⁴ At the same time, several scholars have questioned whether creating entirely new human rights is either necessary or desirable. They contend that existing constitutional rights can evolve to address technological developments through judicial interpretation and appropriate legislative reform.⁵

India has not yet enacted legislation specifically regulating neurotechnology or neural data. Nevertheless, this does not mean that individuals are left without legal protection. Over the past several decades, the Supreme Court of India has interpreted Article 21 of the Constitution as a dynamic guarantee encompassing privacy, dignity, autonomy and personal liberty. Decisions such as *Justice K.S. Puttaswamy (Retd.) v Union of India* and *Selvi v State of Karnataka* demonstrate the Court's willingness to protect both informational privacy and the integrity of an individual's mental processes.⁶ However, while these constitutional principles provide a strong normative foundation, they were developed before the widespread emergence of consumer neurotechnology and therefore do not directly address issues relating to neural data governance.

The enactment of the Digital Personal Data Protection Act, 2023 marked a significant step towards strengthening India's data protection framework. The Act establishes obligations for data fiduciaries, recognises rights of data principals and introduces a consent-based regime for processing digital personal data.⁷ Yet it does not identify neural data as a distinct category of sensitive information, nor does it prescribe safeguards for technologies capable of recording or decoding neural activity. As neurotechnology continues to evolve, these omissions become increasingly significant.

⁴ Constitution of the Republic of Chile 1980

⁵ Jan Christoph Bublitz, 'Novel Neurorights: From Nonsense to Substance' (2022) 15 *Neuro Ethics* <<https://link.springer.com/article/10.1007/s12152-022-09481-3>> accessed 10 June 2026

⁶ *Justice K S Puttaswamy (Retd) & Anr v Union of India & Ors* (2017) 10 SCC 1; *Selvi & Ors v State of Karnataka & Anr* (2010) 7 SCC 263

⁷ Digital Personal Data Protection Act 2023

This article examines whether India's existing legal framework is capable of addressing these emerging challenges. It argues that Article 21 already contains the constitutional principles necessary to protect mental privacy, dignity and cognitive autonomy. The immediate need, therefore, is not the recognition of separate constitutional neurorights. Instead, India requires a specialised governance framework that complements constitutional protections with targeted statutory safeguards, ethical oversight and technology-specific regulation. Such an approach would enable innovation to flourish while ensuring that advances in neuroscience remain consistent with constitutional values and individual freedoms.

The discussion proceeds in six parts. The first examines the evolution of neurotechnology and the emergence of neurorights. The second analyses the constitutional protection available under Article 21. The third evaluates the Digital Personal Data Protection Act, 2023. The fourth studies comparative developments in selected jurisdictions and international organisations. The fifth identifies the regulatory gaps within the Indian framework. The final part proposes a governance model suitable for India's constitutional and technological landscape.

NEUROTECHNOLOGY AND THE EVOLUTION OF THE NEURORIGHTS DEBATE

Technological innovation has consistently required the law to reconsider the scope of existing rights. The emergence of the internet reshaped legal understandings of privacy, artificial intelligence has challenged traditional notions of accountability, and neurotechnology has now brought the human mind within the sphere of legal regulation. Unlike previous technological developments, neurotechnology does not merely generate new forms of personal data. It enables direct interaction with neural activity, raising concerns about whether existing legal protections remain adequate in an era where thoughts and cognitive processes may become technologically accessible.

Neurotechnology refers to a broad range of technologies that interact with the human nervous system by recording, interpreting or modifying neural activity. These technologies include brain-computer interfaces, deep brain stimulation devices, electroencephalography systems and artificial intelligence tools capable of analysing neural signals. Their primary purpose has traditionally been therapeutic. Brain-computer interfaces have enabled individuals suffering from paralysis to communicate through neural signals, while deep brain stimulation has significantly improved the treatment of neurological conditions such as Parkinson's disease.

Recent developments, however, demonstrate that neurotechnology is no longer confined to hospitals and research laboratories. Consumer devices capable of monitoring attention, emotional responses and cognitive performance are increasingly entering commercial markets. Technology companies are investing substantial resources in developing wearable neural devices intended for communication, entertainment, education and workplace productivity. As neurotechnology becomes integrated into everyday life, legal concerns extend beyond medical ethics and enter the broader domains of constitutional law, privacy law and data governance.

One of the principal reasons for this shift is the unique nature of neural data. Traditional categories of personal information generally consist of data consciously provided by individuals or generated through observable activities. Neural data differs because it originates directly from brain activity and may reveal information that an individual neither intends nor expects to disclose. Depending upon the technology employed, neural signals may indicate emotional responses, cognitive patterns, intentions or other aspects of mental functioning. Consequently, many scholars argue that treating neural information as ordinary personal data fails to recognise its exceptional sensitivity.

These concerns prompted Marcello Ienca and Roberto Andorno to introduce the concept of *neurorights* in 2017. They argued that rapid advances in neuroscience exposed limitations within existing human rights frameworks because traditional constitutional protections were developed when access to an individual's mental processes was technologically impossible. Their proposal identified four interconnected rights that should receive explicit legal recognition.

The first is **cognitive liberty**, which protects an individual's freedom to decide whether neurotechnology should be used in relation to their own mind. It safeguards both the freedom to access beneficial neurotechnologies and the freedom to refuse technological interference.

The second is **mental privacy**, which seeks to prevent unauthorised access to neural information. Unlike ordinary privacy protections that focus upon communications or personal data, mental privacy is concerned with preserving the confidentiality of thoughts, intentions and cognitive processes that may become accessible through neurotechnology.

The third is **mental integrity**, which protects individuals against technological interventions capable of altering neural activity without informed consent. This right recognises that

neurotechnological interference may affect decision-making, behaviour or emotional functioning in ways that traditional legal doctrines were never designed to address.

The fourth is **psychological continuity**, sometimes described as psychological identity. It seeks to preserve the continuity of an individual's personality and sense of self by protecting against technological interventions that fundamentally alter memory, identity or cognitive functioning.

Although these proposed neurorights have significantly influenced contemporary legal scholarship, they have not been universally accepted. Critics argue that many of these interests are already protected through existing constitutional rights relating to privacy, dignity, bodily integrity and freedom of thought. Christoph Bublitz, for instance, cautions against the unnecessary multiplication of human rights where existing legal principles are capable of adapting to technological developments through judicial interpretation and legislative reform. Similar concerns have been expressed by scholars who view governance, rather than constitutional innovation, as the more appropriate response to neurotechnology.

This debate has influenced legal developments across several jurisdictions. Chile became the first country to constitutionally recognise protection against threats arising from scientific and technological developments affecting mental integrity, followed by legislation regulating neurotechnology and neural data.⁸ In the United States, Colorado amended its privacy legislation to classify neural data as sensitive personal data, thereby extending enhanced statutory safeguards to information generated through neurotechnological devices.⁹ At the international level, both the OECD and UNESCO have emphasised responsible innovation, transparency, informed consent and respect for human dignity while encouraging Member States to develop governance frameworks capable of addressing the ethical and legal implications of neurotechnology.

These international developments demonstrate an emerging consensus that neurotechnology presents challenges beyond those contemplated by traditional data protection laws. However, they also reveal the absence of a uniform legal response. While some jurisdictions have embraced the language of neurorights, others have preferred governance based upon existing

⁸ Constitution of the Republic of Chile 1980

⁹ Colorado Privacy Act 2023

constitutional principles supported by targeted legislation. This distinction assumes particular significance for India, where Article 21 has repeatedly evolved to protect emerging dimensions of human dignity and personal liberty. The next section therefore examines whether the constitutional framework already provides protection for interests that neurorights seek to safeguard, or whether a separate constitutional approach is required.

ARTICLE 21 AND THE CONSTITUTIONAL PROTECTION OF MENTAL AUTONOMY

The debate surrounding neurorights often begins with the assumption that existing constitutional rights are inadequate to regulate neurotechnology. While this argument has gained considerable international attention, its applicability to India requires closer examination. Unlike jurisdictions where privacy and personal autonomy have developed through fragmented statutory protections, India possesses a dynamic constitutional framework under Article 21 that has progressively expanded to safeguard human dignity, privacy and individual autonomy. The critical question, therefore, is not whether Article 21 recognises these values, but whether they are capable of extending to the unique challenges posed by neurotechnology.

Article 21 provides that *‘No person shall be deprived of his life or personal liberty except according to procedure established by law.’* At the time of its adoption, the provision was interpreted narrowly, primarily as a procedural safeguard against arbitrary deprivation of life and liberty. Over the decades, however, the Supreme Court adopted a purposive approach and transformed Article 21 into one of the broadest guarantees of fundamental rights within the Indian Constitution.¹⁰ Today, the expression ‘life and personal liberty’ encompasses far more than mere physical existence. It includes dignity, privacy, bodily integrity, decisional autonomy and the freedom to develop one's personality. This constitutional evolution is particularly significant when examining neurotechnology because the interests sought to be protected through neurorights closely correspond with values already recognised under Article 21.

The Constitutional Evolution of Privacy: The constitutional foundation of privacy developed gradually through judicial interpretation. In *Kharak Singh v State of Uttar Pradesh*,

¹⁰ *Maneka Gandhi v Union of India* (1978) 1 SCC 248

the Supreme Court invalidated domiciliary visits conducted under police surveillance regulations, holding that unauthorised intrusion into an individual's home violated personal liberty under Article 21.¹¹ Although the Court did not expressly recognise privacy as a fundamental right, the judgment marked an important departure from earlier approaches by acknowledging that personal liberty extends beyond protection against physical restraint.

The scope of privacy was further developed in *Gobind v State of Madhya Pradesh*, where the Supreme Court accepted that privacy could be recognised as a fundamental right, although not an absolute one. The Court observed that privacy is intrinsic to personal liberty and must be assessed by balancing individual freedom against compelling State interests.¹² This decision established the constitutional basis upon which subsequent privacy jurisprudence would evolve.

The jurisprudence matured significantly in *People's Union for Civil Liberties v Union of India*, where the Court examined telephone interception under the Indian Telegraph Act, 1885. Recognising that unrestricted surveillance threatens individual liberty, the Court held that interception of private communications directly implicates the right to privacy protected by Article 21 and emphasised the necessity of procedural safeguards to prevent arbitrary State action.¹³ Although the case concerned telephonic communication rather than neural information, its reasoning demonstrates an important constitutional principle. Technological capability does not automatically justify unrestricted access to deeply personal information.

The constitutional position was conclusively settled by the nine-judge Bench in *Justice K.S. Puttaswamy (Retd.) v Union of India*. Declaring privacy to be a fundamental right protected under Article 21, the Court held that privacy is inseparable from dignity, autonomy and individual liberty.¹⁴ Importantly, the judgment recognised that constitutional protection extends beyond physical spaces and encompasses informational privacy, decisional autonomy and the individual's ability to control the dissemination of personal information. These observations acquire renewed significance in the context of neurotechnology because neural data represents one of the most intimate forms of personal information capable of being generated.

¹¹ *Kharak Singh v State of Uttar Pradesh & Ors* (1964) (1) SCR 332

¹² *Gobind v State of Madhya Pradesh & Anr* (1975) 2 SCC 148

¹³ *People's Union for Civil Liberties v Union of India & Anr* (1997) 1 SCC 301

¹⁴ *Justice K S Puttaswamy (Retd) & Anr v Union of India & Ors* (2017) 10 SCC 1

Viewed collectively, these decisions demonstrate that the constitutional understanding of privacy has evolved alongside technological developments. Rather than confining protection to tangible spaces or physical interference, the Supreme Court has consistently recognised that constitutional guarantees must adapt to emerging forms of intrusion. This evolutionary approach provides a strong foundation for extending Article 21 to neurotechnology without requiring the formal recognition of a separate constitutional right to mental privacy.

Autonomy, Dignity and Mental Integrity: Privacy alone does not adequately address every concern arising from neurotechnology. Devices capable of influencing cognition or neural activity also raise questions regarding autonomy, bodily integrity and the freedom to make personal choices. These constitutional values have likewise received extensive recognition under Article 21.

In *Suchita Srivastava v Chandigarh Administration*, the Supreme Court held that reproductive choice forms an essential component of personal liberty. The Court emphasised that an individual's ability to make intimate decisions concerning their own body lies at the core of constitutional autonomy and human dignity.¹⁵ Although the decision arose in the context of reproductive rights, its reasoning extends beyond that specific issue. The broader constitutional principle is that meaningful personal choice cannot exist where external control substitutes individual decision-making.

The importance of autonomy was further reinforced in *Navtej Singh Johar v Union of India*. While declaring Section 377 of the Indian Penal Code unconstitutional to the extent of consensual same sex relations, the Supreme Court affirmed that dignity, identity and self-determination constitute essential aspects of constitutional liberty.¹⁶ The judgment recognised that the Constitution protects not merely physical freedom but also the individual's right to define and express their own identity. In the context of neurotechnology, this reasoning assumes particular significance because technologies capable of influencing cognition or behaviour may directly affect personal identity and psychological continuity.

The constitutional protection of mental integrity received its clearest expression in *Selvi v State of Karnataka*. The case concerned the involuntary administration of narcoanalysis, polygraph

¹⁵ *Suchita Srivastava & Anr v Chandigarh Administration* (2009) 9 SCC 1

¹⁶ *Navtej Singh Johar v Union of India* Thr Secretary Ministry of Law and Justice (2018) 10 SCC 1

examinations and Brain Electrical Activation Profile tests during criminal investigations. The Supreme Court held that compelling an individual to undergo such techniques violated Articles 20(3) and 21 because they interfered with personal liberty, mental privacy and the freedom against testimonial compulsion.¹⁷ The Court recognised that constitutional protection extends beyond physical integrity and includes protection against involuntary intrusion into an individual's mental processes.

Among all Indian decisions, *Selvi* bears the closest relationship to contemporary neurotechnology. Although decided before the widespread development of consumer neurotechnologies, the judgment establishes an important constitutional principle. Access to an individual's mind cannot be justified merely because technological capability makes such access possible. The legitimacy of any intrusion into mental processes must remain subject to constitutional limitations grounded in dignity, autonomy and informed consent.

The trajectory of Article 21 therefore reveals a consistent pattern. Each stage of constitutional development has expanded the scope of personal liberty in response to changing social and technological realities. Privacy, dignity, autonomy and mental integrity are no longer isolated constitutional concepts but interconnected principles that collectively protect the individual against intrusive exercises of power.

This constitutional evolution also explains why India's position differs from jurisdictions advocating the recognition of separate neurorights. The interests protected through cognitive liberty, mental privacy and psychological continuity substantially overlap with values already recognised under Article 21. The constitutional challenge, therefore, is not the absence of rights but the absence of a regulatory framework capable of applying those rights to emerging neurotechnologies. The following section examines whether the Digital Personal Data Protection Act, 2023 succeeds in addressing that regulatory gap.

THE DIGITAL PERSONAL DATA PROTECTION ACT, 2023 AND THE REGULATION OF NEURAL DATA

The recognition of privacy as a fundamental right under Article 21 established an important constitutional foundation for protecting individuals against arbitrary intrusions into their

¹⁷ *Selvi & Ors v State of Karnataka & Anr* (2010) 7 SCC 263

personal sphere. Constitutional rights, however, cannot by themselves regulate the everyday collection, processing and commercial use of personal data by public and private entities. That responsibility largely falls upon statutory law. The enactment of the Digital Personal Data Protection Act, 2023 therefore represents a significant milestone in India's evolving data protection regime. Yet, despite introducing a comprehensive framework for digital personal data, the Act does not adequately address the distinctive legal concerns arising from neurotechnology.

The Digital Personal Data Protection Act, 2023 governs the processing of digital personal data and establishes a consent-based framework intended to protect the rights of data principals while imposing corresponding obligations upon data fiduciaries.¹⁸ The Act requires personal data to be processed for lawful purposes after obtaining free, specific, informed and unambiguous consent, subject to certain legitimate uses recognised by the legislation. It also grants individuals several rights, including the right to access information regarding data processing, seek correction or erasure of personal data, nominate another person to exercise rights in specified circumstances and seek grievance redressal against violations of the Act.

These safeguards undoubtedly strengthen India's legal framework for data protection. Nevertheless, the Act approaches all forms of digital personal data through a largely uniform regulatory model. It does not distinguish neural data from other categories of personal information, despite the exceptional sensitivity of information generated directly from human brain activity. This omission is significant because neural data possesses characteristics that fundamentally differentiate it from ordinary digital data.

Unlike financial records, contact information or browsing history, neural data has the potential to reveal deeply personal aspects of an individual's mental life. Depending upon the capabilities of the technology employed, it may disclose emotional responses, cognitive patterns, intentions, behavioural tendencies or neurological conditions. In certain circumstances, neural information may even reveal data that an individual neither consciously intends nor voluntarily communicates. Consequently, the risks associated with neural data extend beyond ordinary informational privacy and implicate autonomy, dignity and freedom of thought.

¹⁸ Digital Personal Data Protection Act 2023

The absence of a statutory definition of neural data presents the first significant regulatory gap within the DPDP Act. Since the legislation does not recognise neural information as a separate category of personal data, information generated through brain-computer interfaces or similar technologies would presently be governed by the same legal standards applicable to ordinary digital data. Such an approach overlooks the distinctive relationship between neural information and individual autonomy. The law treats information derived from the human brain in substantially the same manner as data generated through online transactions or digital communications, despite the profound differences in their nature and potential consequences.

A second concern relates to informed consent. The DPDP Act appropriately recognises consent as the primary basis for lawful processing of personal data. However, obtaining meaningful consent in the context of neurotechnology presents challenges that differ considerably from conventional digital platforms. Individuals using wearable neurotechnological devices may not fully understand the nature, scope or future uses of neural information collected by such technologies. The complexity of artificial intelligence systems capable of analysing neural signals further complicates the individual's ability to appreciate the implications of consent. In these circumstances, formal compliance with statutory consent requirements may not necessarily translate into genuine cognitive autonomy.

Another important limitation concerns commercial exploitation. As consumer neurotechnology continues to expand, technology companies may increasingly rely upon neural information to personalise services, predict consumer behaviour or develop artificial intelligence systems. Although the DPDP Act regulates the processing of personal data generally, it contains no provisions specifically governing behavioural profiling based upon neural information or restricting commercial uses capable of affecting cognitive freedom. This omission assumes greater significance because neural information may reveal characteristics substantially more intimate than conventional behavioural data collected through digital platforms.

The Act also remains largely silent regarding the governance of artificial intelligence systems trained using neural data. Machine learning technologies capable of identifying behavioural patterns or predicting individual responses from brain activity raise questions relating to algorithmic transparency, accountability and discrimination. Existing provisions governing

personal data processing do not sufficiently address these issues because they were not specifically designed for technologies capable of analysing neural information.

These limitations should not be understood as diminishing the significance of the DPDP Act. On the contrary, the legislation establishes an essential statutory foundation for protecting digital privacy in India. However, its general approach to data protection reveals an important distinction between conventional personal information and neural data. The former concerns information generated through human activity, whereas the latter originates directly from the functioning of the human brain itself. Recognising this distinction is crucial for developing an effective regulatory framework.

The DPDP Act therefore illustrates both the strengths and limitations of India's present legal framework. While constitutional jurisprudence under Article 21 provides robust normative protection for dignity, privacy and autonomy, the statutory regime has not yet evolved to address the distinctive characteristics of neurotechnology. The challenge before Indian lawmakers is not to replace the existing framework but to supplement it through targeted legislation capable of regulating neural data, ensuring meaningful consent and establishing appropriate safeguards for emerging neurotechnologies.

This conclusion becomes clearer when India's approach is compared with developments in other jurisdictions that have already begun recognising the distinctive legal status of neural information.

COMPARATIVE PERSPECTIVES: LESSONS FOR INDIA'S REGULATORY FRAMEWORK

The legal challenges posed by neurotechnology have prompted diverse responses across jurisdictions. While some countries have sought to recognise new rights specifically designed for neurotechnology, others have preferred to strengthen existing legal frameworks through statutory reform and ethical governance. These differing approaches demonstrate that there is no universally accepted model for regulating neurotechnology. Rather than identifying a single ideal framework, comparative analysis provides valuable insights into how different legal systems have attempted to reconcile technological innovation with the protection of fundamental rights.

Chile: Constitutional Recognition of Neurorights: Chile occupies a unique position in the development of neurotechnology law. In 2021, it became the first country to amend its Constitution to recognise protection against threats arising from scientific and technological developments affecting mental integrity.¹⁹ This constitutional amendment was followed by legislative initiatives designed to regulate neurotechnology and safeguard neural data. Chile's approach reflects the view that advances in neuroscience have created risks sufficiently distinct to justify explicit constitutional recognition. By acknowledging the possibility of technological interference with mental processes, Chile sought to ensure that human dignity and cognitive autonomy remain protected as neurotechnology continues to evolve.

The Chilean model has attracted considerable international attention because it symbolises an important shift in constitutional thinking. Instead of waiting for technological harm to occur, the Constitution proactively recognises the need to protect individuals from future neurotechnological risks. Despite its significance, the Chilean approach has not escaped criticism. Several scholars have questioned whether recognising separate neurorights at the constitutional level necessarily produces stronger legal protection than an expansive interpretation of existing fundamental rights. Constitutional recognition alone cannot regulate data processing practices, establish licensing standards or prescribe technical safeguards for neurotechnology. Effective governance ultimately depends upon detailed legislation, regulatory institutions and practical enforcement mechanisms.²⁰ Consequently, while Chile demonstrates remarkable constitutional innovation, it does not conclusively establish that constitutional amendment is the only or even the most effective response to neurotechnology.

Colorado: A Statutory Approach to Neural Data: A markedly different approach has emerged in the United States. Instead of creating new constitutional rights, the State of Colorado amended its privacy legislation to recognise neural data as a form of sensitive personal data entitled to enhanced statutory protection.²¹

Colorado's approach is significant because it acknowledges that information generated directly from brain activity differs fundamentally from ordinary personal data. By extending stronger

¹⁹ Constitution of the Republic of Chile 1980

²⁰ Sjors Ligthart et al., 'Minding Rights: Mapping the Ethical and Legal Foundations of 'Neurorights'' (2023) 15(1) Camb Q Healthc Ethics <<https://pubmed.ncbi.nlm.nih.gov/37183686/>> accessed 10 June 2026

²¹ Colorado Privacy Act 2023

legal safeguards to neural information, the legislation seeks to address many of the practical concerns associated with neurotechnology without altering existing constitutional doctrine. This model offers an important lesson for India. Rather than restructuring constitutional jurisprudence, legislatures may strengthen existing data protection laws by identifying neural information as a distinct category requiring heightened protection. Such an approach allows statutory safeguards to evolve alongside technological developments while preserving constitutional stability.

International Governance through the OECD and UNESCO: International organisations have largely avoided advocating the immediate recognition of new constitutional rights. Instead, they have emphasised responsible governance, ethical oversight and human-centred innovation.

In 2019, the OECD adopted the *Recommendation of the Council on Responsible Innovation in Neurotechnology*, encouraging Member States to promote scientific innovation while ensuring respect for human rights, transparency, accountability and public trust. Rather than prescribing rigid legal rules, the Recommendation provides broad governance principles capable of guiding national regulatory frameworks.

UNESCO has adopted a similar position by emphasising that neurotechnology should be developed and deployed consistently with human dignity, autonomy, informed consent and social justice. Its guidance reflects the understanding that legal regulation alone cannot adequately address the ethical implications of rapidly evolving neurotechnologies. Instead, governance should integrate law, ethics, scientific expertise and public participation.

The approaches adopted by the OECD and UNESCO therefore differ from the Chilean model. Rather than prioritising constitutional innovation, they encourage comprehensive governance frameworks capable of adapting to technological change without requiring continuous constitutional revision.

Comparative Assessment: The comparative analysis reveals three distinct regulatory models.

- The first, represented by Chile, seeks to protect individuals through explicit constitutional recognition of neurorights.

- The second, illustrated by Colorado, strengthens statutory data protection by recognising neural data as uniquely sensitive information.
- The third, reflected in the OECD and UNESCO frameworks, emphasises governance through ethical principles, regulatory oversight and responsible innovation.

Each model offers valuable insights. However, none can be transplanted directly into the Indian legal system. India's constitutional jurisprudence has already evolved considerably through Article 21, recognising privacy, dignity, autonomy and mental integrity as integral components of personal liberty. In this respect, India differs fundamentally from jurisdictions that sought constitutional reform to fill gaps in rights protection. At the same time, India's statutory framework remains comparatively underdeveloped in relation to neurotechnology. Unlike Colorado, the Digital Personal Data Protection Act, 2023 does not distinguish neural data from ordinary personal information. Nor does it incorporate the governance principles advocated by international organisations concerning transparency, accountability and ethical oversight.

Accordingly, the comparative experience suggests that India's constitutional framework requires reinforcement rather than replacement. Constitutional values already exist. The greater need lies in translating those values into an effective statutory and regulatory framework capable of responding to emerging neurotechnologies. The comparative study therefore strengthens the central argument of this article. India's future does not lie in importing foreign constitutional models wholesale. Instead, it lies in combining the constitutional protections already recognised under Article 21 with targeted statutory reform and internationally accepted governance principles.

RETHINKING INDIA'S RESPONSE: FROM NEURORIGHTS TO NEUROTECHNOLOGY GOVERNANCE

The preceding discussion demonstrates that neurotechnology presents legal challenges which cannot be ignored. It also reveals that jurisdictions across the world have responded in different ways, ranging from constitutional recognition of neurorights to statutory reform and ethical governance. The Indian position, however, requires a distinct approach. Importing foreign constitutional models without considering India's existing constitutional framework would neither be necessary nor desirable. Instead, the response must be rooted in India's constitutional jurisprudence while remaining adaptable to future technological developments.

The debate surrounding neurorights often assumes that emerging technologies have created entirely new legal interests that existing constitutional rights are incapable of protecting. This assumption does not accurately reflect the position under Indian constitutional law. As demonstrated in the previous section, Article 21 has evolved through judicial interpretation to protect privacy, dignity, bodily integrity, decisional autonomy and mental liberty. These constitutional values substantially correspond with the interests that proponents of neurorights seek to safeguard through concepts such as cognitive liberty, mental privacy and psychological continuity.²²

This is not to suggest that neurotechnology creates no new legal concerns. On the contrary, the collection and analysis of neural data present risks that differ fundamentally from those associated with conventional digital information. Brain activity may reveal subconscious preferences, emotional responses, behavioural tendencies and cognitive characteristics that an individual neither intends nor expects to disclose. The increasing use of artificial intelligence to interpret such information further complicates questions of consent, accountability and transparency. These developments undoubtedly require legal intervention. The critical issue, however, is the form that such intervention should take.

Recognising separate constitutional neurorights may appear attractive because it symbolically acknowledges the importance of protecting the human mind. Nevertheless, constitutional rights are necessarily broad and abstract. They establish fundamental values but rarely provide detailed regulatory standards governing rapidly evolving technologies. Questions relating to licensing, commercial use of neural data, algorithmic transparency, data retention, cross-border transfer of information and oversight of private technology companies cannot realistically be resolved through constitutional adjudication alone. Such matters are more appropriately addressed through legislation supported by specialised regulatory institutions.

For this reason, the immediate priority for India should not be constitutional innovation but regulatory innovation. The Constitution already provides the normative foundation. What remains absent is a comprehensive governance framework capable of translating constitutional values into practical safeguards. Such a framework should regulate not merely the collection of

²² *Justice K S Puttaswamy (Retd) & Anr v Union of India & Ors* (2017) 10 SCC 1; *Selvi & Ors v State of Karnataka & Anr* (2010) 7 SCC 263; *Suchita Srivastava & Anr v Chandigarh Administration* (2009) 9 SCC 1; *Navtej Singh Johar v Union of India Thr Secretary Ministry of Law and Justice* (2018) 10 SCC 1

neural data but the entire life cycle of neurotechnology, beginning with research and development and extending to commercial deployment, data processing, artificial intelligence systems and consumer protection.

A governance-centred approach offers several advantages. First, it preserves the flexibility of Article 21, allowing constitutional principles to continue evolving through judicial interpretation without requiring frequent constitutional amendments. Secondly, it enables Parliament to respond more effectively to technological developments through legislation that can be amended as scientific knowledge progresses. Finally, it recognises that neurotechnology presents multidisciplinary challenges involving law, ethics, medicine, neuroscience and artificial intelligence. Effective regulation therefore requires cooperation between legal institutions, scientific experts, regulatory authorities and technology developers rather than reliance upon constitutional litigation alone.

Such a framework should incorporate several essential features. The first is the statutory recognition of neural data as a distinct category of highly sensitive personal information. Given its intimate connection with cognitive processes and personal identity, neural information warrants stronger legal protection than ordinary digital data. The second is the development of enhanced consent standards specifically designed for neurotechnology. Individuals should receive clear and comprehensible information regarding the nature of neural data being collected, the purposes for which it will be used, the risks associated with processing and the possibility of future technological developments affecting such data.

A third component concerns accountability in the use of artificial intelligence. Organisations developing or deploying systems capable of analysing neural information should be required to maintain transparency regarding data processing practices, decision-making processes and potential risks arising from algorithmic analysis. Independent audits and regulatory oversight would further strengthen public confidence while reducing the possibility of misuse.

Equally important is the establishment of a specialised regulatory or advisory body comprising legal scholars, neuroscientists, ethicists, medical professionals and technology experts. Existing data protection mechanisms are not specifically designed to evaluate the complex ethical and scientific questions arising from neurotechnology. A multidisciplinary institution could

therefore provide guidance on research ethics, consumer protection, technological standards and future legislative reforms.

Public awareness also forms an indispensable component of effective governance. The benefits and risks associated with neurotechnology remain poorly understood by the general public. Individuals cannot meaningfully exercise autonomy if they lack awareness regarding the nature of technologies capable of recording or interpreting neural activity. Public education, transparency obligations and accessible regulatory guidance would therefore strengthen both individual choice and democratic accountability.

Importantly, adopting a governance framework does not diminish the significance of constitutional rights. On the contrary, it reinforces them. Article 21 would continue to serve as the constitutional foundation from which statutory obligations derive legitimacy. Legislative reform would therefore complement, rather than replace, existing constitutional protections. This relationship between constitutional values and statutory regulation reflects the broader structure of Indian constitutional law, where legislation frequently gives practical effect to fundamental rights recognised by judicial interpretation.

The discussion therefore supports a central conclusion. India's principal challenge does not arise from the absence of constitutional protection but from the absence of specialised regulation. The future of neurotechnology law in India lies neither in constitutional silence nor constitutional expansion. It lies in constructing a governance framework that enables constitutional principles to operate effectively within an increasingly complex technological environment. Such an approach preserves the strength of Article 21 while ensuring that the legal system remains capable of responding to scientific innovation without compromising human dignity, autonomy and freedom of thought.

A FIVE PILLAR NEUROTECHNOLOGY GOVERNANCE FRAMEWORK FOR INDIA

The preceding analysis demonstrates that India's existing constitutional framework already provides significant protection for privacy, dignity and personal autonomy. The principal deficiency lies in the absence of legislation specifically addressing neurotechnology and neural data. Consequently, rather than recognising separate constitutional neurorights, India should

adopt a governance framework capable of translating constitutional principles into practical regulatory safeguards. Such a framework should rest upon five interrelated pillars.

Statutory Recognition of Neural Data: The first step should be the formal recognition of neural data as a distinct category of highly sensitive personal information. The Digital Personal Data Protection Act, 2023 presently regulates all forms of digital personal data through a broadly uniform framework. While this approach is appropriate for most categories of personal information, it fails to recognise the exceptional nature of data generated directly from human brain activity.

Neural data is qualitatively different from conventional personal information because it may disclose an individual's cognitive processes, emotional responses, neurological conditions and behavioural tendencies. Treating such information in the same manner as ordinary digital data overlooks its close relationship with personal autonomy and mental privacy. A statutory amendment recognising neural data as a specially protected category would therefore constitute an important first step towards effective regulation.²³

Enhanced Standards of Informed Consent: Consent occupies a central position within India's existing data protection framework. However, meaningful consent in the context of neurotechnology requires standards that extend beyond conventional privacy notices.

Individuals should receive clear and comprehensible information regarding the nature of neural information being collected, the purpose of collection, the technologies used for analysis, the duration of storage, potential third-party disclosures and the possibility of future technological developments affecting such data. Consent should remain specific, informed and capable of being withdrawn without unreasonable barriers. Such safeguards would strengthen individual autonomy while promoting public confidence in responsible neurotechnology.

Transparency and Accountability in Artificial Intelligence: The growing integration of artificial intelligence with neurotechnology presents regulatory challenges extending beyond data protection alone. Artificial intelligence systems capable of interpreting neural signals may influence decisions relating to healthcare, employment, education or consumer behaviour. Their operation should therefore remain transparent, accountable and subject to meaningful

²³ Digital Personal Data Protection Act 2023

oversight. Developers and organisations deploying neurotechnology should maintain records explaining the purposes for which neural information is processed, the methods of algorithmic analysis and the safeguards adopted to minimise bias, discrimination and misuse. Independent audits and periodic regulatory review would further strengthen accountability while encouraging responsible technological innovation.

Establishment of a National Neurotechnology Ethics Council: Given the interdisciplinary nature of neurotechnology, legal regulation should not operate in isolation. India should establish a specialised advisory body comprising legal scholars, neuroscientists, medical professionals, ethicists, data protection experts and representatives from the technology sector. Such a body could assist the Government in formulating ethical guidelines, evaluating emerging technologies, advising on legislative reforms and promoting responsible scientific research. It could also issue best practice recommendations for research institutions and private entities developing neurotechnological products. A multidisciplinary approach would enable regulation to remain responsive to scientific developments while preserving public trust.

International Cooperation and Periodic Regulatory Review: Neurotechnology is developing within a global scientific ecosystem. Research collaborations, multinational technology companies and cross-border data transfers make purely domestic regulation increasingly difficult. India's regulatory framework should therefore remain consistent with internationally accepted principles while addressing domestic constitutional priorities.

Periodic review of legislation would enable Parliament to respond effectively to technological developments that cannot presently be anticipated. Engagement with international organisations, comparative legal research and scientific communities would further assist India in developing a flexible and future-oriented governance framework capable of adapting to continued innovation. These recommendations are neither exhaustive nor immutable. Their significance lies in demonstrating that effective regulation of neurotechnology does not require the creation of entirely new constitutional rights. Rather, it requires legislation and institutions capable of implementing constitutional values within an evolving technological landscape. In this manner, governance becomes the practical expression of constitutional guarantees rather than their substitute.

CONCLUSION

Advances in neurotechnology have fundamentally altered the relationship between law and the human mind. Technologies capable of recording, interpreting and influencing neural activity present challenges that extend beyond conventional understandings of privacy and data protection, compelling legal systems to reconsider how dignity, autonomy and personal liberty should be protected in an increasingly technological society.

This article has argued that the emergence of neurotechnology does not necessarily require the recognition of separate constitutional neurorights within the Indian legal system. Through decades of constitutional interpretation, Article 21 has evolved into a comprehensive guarantee protecting privacy, dignity, bodily integrity, decisional autonomy and mental liberty. Landmark decisions such as *Justice K.S. Puttaswamy (Retd.) v Union of India* and *Selvi v State of Karnataka* demonstrate that the constitutional values underlying proposed neurorights are already embedded within Indian jurisprudence.

At the same time, constitutional protection alone cannot adequately regulate emerging neurotechnologies. The Digital Personal Data Protection Act, 2023 represents a significant advancement in India's data protection framework but does not specifically recognise neural data or address the distinctive legal challenges arising from technologies capable of accessing and analysing human brain activity. Comparative developments in Chile, Colorado, the OECD and UNESCO further demonstrate that effective regulation depends not only upon constitutional principles but also upon specialised statutory safeguards and institutional governance.

Accordingly, the principal challenge before India is regulatory rather than constitutional. The objective should not be to create an entirely new catalogue of fundamental rights but to ensure that existing constitutional values are translated into effective legislative and institutional mechanisms capable of responding responsibly to scientific innovation. A comprehensive governance framework recognising the unique nature of neural data, strengthening informed consent, promoting transparency in artificial intelligence, establishing multidisciplinary oversight and encouraging international cooperation would enable India to protect individual rights while supporting responsible technological advancement.

As neurotechnology continues to evolve, the law must remain equally dynamic. The Constitution provides the foundation, but legislation and governance must provide the structure through which constitutional values are realised. By adopting a balanced and forward-looking regulatory framework, India can encourage scientific progress without compromising the dignity, autonomy and freedom that lie at the heart of its constitutional order.