

What does it mean? Translating anatomical language to engage public audiences.

Kat A. Sanders^{1,2} and Adam M. Taylor^{3*}

1. School of Medical Sciences, Faculty of Medicine & Health, University of Sydney, Camperdown, Australia.
2. Centre for Anatomical and Human Sciences, Hull York Medical School, University of Hull, Kingston Upon Hull, UK.
3. Lancaster Medical School, Faculty of Health and Medicine, Lancaster University, Lancaster, UK.

* Correspondence to: Professor Adam M. Taylor, Lancaster Medical School, Faculty of Health and Medicine, Lancaster University, Lancaster, UK. Email: a.m.taylor@lancaster.ac.uk

Abstract

The language of anatomy, with its roots in Ancient Greek and Roman languages, is complex and unfamiliar to many. Its complexity creates a significant barrier to public knowledge and understanding of anatomy – many members of the public find themselves asking “what does it mean?”, and this can manifest as poor health literacy and outcomes. To address this, anatomists who interact with the public should be able to translate anatomical language and support the development of individuals’ foundational understanding of why structures are named the way they are. In this review, language is categorized by themes that inform the naming of anatomical structures, such as function, location, and appearance, and paired with pedagogical approaches informed by education and public engagement research to underpin

effective communication that demystifies the language of anatomy for public audiences.

Drawing on pre-existing sometimes unrelated knowledge, gamification and quizzes can make language more accessible and recognisable. Humorous etymological insights into the origins of anatomical terms can build rapport between anatomist and public audience and normalize discussions about sensitive topics, such as genitalia, in an inclusive manner. Finally, eponyms, while contentious due to their lack of diversity and ethical concerns, can serve as narrative subjects to start discussions that address anatomy's relevance to wider socio-political and bioethical discourse. Ultimately, by deploying established science communication tools when translating anatomical language, anatomists can deliver effective public engagement that cultivates ongoing curiosity in anatomy, its language, and more broadly health.

The importance and challenges for public awareness of anatomical language

Anatomy is the cornerstone of the medical sciences; the language of anatomy has its roots in Ancient Greek and Roman languages and cultures (Turmezei, 2012). In these ancient times, all sciences were limited to predominantly descriptive terms for things, one that is better known is that of astronomy and the star signs. The literal translation of Gemini as the twins forms part of a much older example, but demonstrates the same principles that anatomists observe in the terminology they see daily. As the fascination with the body grew, dissection of bodies to understand normal and diseased human structure became commonplace (Ghosh, 2015). Unfortunately, many of their functional descriptions were wrong because they did not have the scientific techniques available today to understand what was happening in terms of health and disease, or even normal function. Examples of errors postulated by some of the most famous anatomists such as Galen include failing to understand the differences between systemic and pulmonary circulations, the origin and destination of arterial and venous blood, as well as recognising the lung as the organ that facilitates gas exchange (Neder, 2020). Things were seen on a very macroscopic level, with microscopic and molecular techniques hundreds and

thousands of years away, respectively. Led by Sylvius and Bauhin in the 16th and 17th centuries, anatomists set about naming anatomical structures (Sakai, 2007) using language from the Ancient Greeks and Romans. However, they were still limited to describing structures based on their appearance and postulations about their function.

Scientific advancements have helped us better understand the function of structures and the pathogenesis of many diseases that were first described hundreds of years ago. Despite correcting historical assumptions and inaccuracies, we continue to use many of the anatomical terms published during the late Renaissance. In recent years, the Federative International Programme for Anatomical Terminology created the *Terminologia Anatomica* to help establish a global common nomenclature for anatomical structures, now in its second edition (FIPAT, 2019). This anatomical language is similarly widely used in medicine, as well as other subjects as a standard means to communicate and describe structures, locations, their relations, and pathologies. One of the challenges around understanding these ancient languages and their influence on the languages of anatomy and medicine, is that they are seldom taught in schools. In the early 20th century, very little had changed from Victorian times, and opportunities to learn these languages in the United Kingdom was limited to those who were deemed to be suitably academically gifted, such as Grammar school pupils (McMillan, 2015). In the 1960s and 1970s, Latin began to appear on comprehensive school subject offerings, with hundreds providing it as an educational option (Garner, 2014). However, lessons on these languages have recently declined; a British Council survey in 2021 found that only 2.7% of public schools, compared to 49% of independent schools offered lessons in Latin (Education, 2021).

Given this decline, a key challenge related to the comprehensibility of anatomical language is that even students and professionals who are learning anatomy may be unaware of the origins or understanding of what anatomical terms mean. With the growing accessibility of medical records to patients, these terms and references are now widely available to patients, which presents the

issue of lack of knowledge or understanding about their meaning(s) (Easterling and Byram, 2022). This can create confusion and worry for patients and potentially increase the burden on healthcare services, as patients try to gain follow-up appointments to find out what things mean or how they may need further management. While technical medical terminology is commonplace, if healthcare professionals are not able to effectively translate this language, it creates issues when communicating clearly with their patients (Taylor et al., 2018; Cheung et al., 2023; Taylor and Wessels, 2024).

Anatomical knowledge in the public and its potential value

Adult knowledge about anatomical and health terms is varied; in North America, 40% of adults have marginal, and 22% have inadequate health literacy levels which was linked with hospital readmissions (Shahid et al., 2022). Those with poor health literacy have difficulty understanding prescription labels, participating in medical decisions, following medical recommendations, and attending their follow-up appointments (Williams et al., 1995; Martin et al., 2005; Shahid, et al., 2022). A similar study demonstrates that males, younger individuals, immigrants, those with basic levels of education, a wage below the national average, or receiving state benefits were all associated with poor health literacy. Those individuals with inadequate health literacy levels were more likely to revisit emergency departments, increasing demand on healthcare resources and provision as well as potentially negatively impacting their treatment and recovery (Svendsen et al., 2020).

Specifically in anatomy, colleagues have shown that there is a global lack of public knowledge of anatomical structures and their location (Taylor, et al., 2018; Cheung, et al., 2023). It could be assumed that if they cannot identify the location of structures, they may not be able to understand their function or other affiliated knowledge. Indeed, it seems that it is the complexity of anatomical language that exacerbates the difficulty in identifying structures. Evidence to support this is seen from the Anatomy Nights study looking at brain knowledge of international audiences attending anatomy outreach events (Sanders et al., 2022). Participants at Anatomy

Nights were asked to identify a series of structures on an image of the brain. Structures that had non-science specific terms in their names, such as “brain stem” and “frontal lobe”, scored so highly in pre-event tests that there was little scope for improvement in post-event tests. The names of these anatomical structures reflect the normal definitions of these words: the brain stem descends from under the brain, like a plant’s stem is under the flower; the frontal lobe is at the front of the brain. While it cannot be stated with certainty that it is the public’s familiarity with the words rather than already knowing what these structures are, these were the only questions without anatomical jargon in their name assessed in this study. In contrast, terms with more scientific names (e.g., occipital and parietal lobes, cerebellum) scored poorly in the pre-event tests, with improvement after the Anatomy Nights event (Sanders, et al., 2022).

The issue of the complexity of anatomical language is not a new one and with a multitude of exposure to anatomical (and medical) terms throughout each individual’s life, there is a growing need to ensure that the public can better understand what they are hearing and reading. This presents an opportunity and a responsibility for anatomists to incorporate an understanding of this language into engagement and learning opportunities for the public in the hope that they can learn and make (more) informed decisions, particularly when this information relates to their health or that of their family and friends.

Breaking down anatomical language for public audiences

Words and their meaning

Anatomists who engage with public audiences need to be able to demystify the language of anatomy. To do this, categorizing anatomical names into core themes can provide a structure for presenters and audiences alike to follow. Examples of Latin and Greek names of structures are typically found in major categories; function, location, and appearance; these will be explored further.

Those structures named for **function** include muscles such as “flexor”, “extensor”, “levator”, “pronator”, and “tensor”. These muscle descriptors offer clues as to the action of the muscle(s) at joints or in moving bones. Putting these terms into the full context of the muscle enables a greater understanding of the location and function. Indeed, this can be signposted to public audiences, encouraging them to look for familiar words and use these to elucidate the function of a structure. For example, “flex-”, “digit-” and “superficial-” in *flexor digitorum superficialis* tells you that it is a superficial flexor of the digits.

The structures named for their **location** (Table 1), provide a useful description once translated. Similarly, names that refer to attachment sites (e.g., sternocleidomastoid) allow the anatomist to (re)introduce palpable skeletal features (sternum, clavicle (cleido), mastoid process) that audiences can locate on their own bodies, and by understanding attachment, audiences can develop an understanding (rather than simple knowledge) of the function of the muscle.

Next, there are structures that are described for their **appearance** (Table 2). Some are obvious to those without exposure to anatomical or medical language, such as longus, magnus, and rhomboid all falling into this category, descriptors of long, large, and rhomboid in shape.

(Brassett C, 2017). While other examples may require further explanation.

Games and competition – making it fun.

Rather than trying to rote learn these in a list or medical context, anatomists have moved to try and engage learners with fun and competition, gamifying anatomy for public and university audiences alike. This progresses from one of the most popular cards games in recent years “Organ Attack” (YetiGames; Taylor and Wessels, 2024). Others have developed their own games to assist with student learning and understanding by bringing their own games forward that combine learning with the competitive nature and fun that reduces the cognitive focus. One

such example is Wordotomy which looks at the basis of the anatomical words and what they mean (Moyes, 2023). Another avenue to incorporate active audience engagement with anatomical language is to interrogate these names through the medium of traditional party games like charades and Pictionary. It has been demonstrated that these games have a positive impact on university students' learning of scientific vocabulary (Dickson and Stephens, 2015; Peterson, 2017) and can easily be applied to a live public audience. Furthermore, quiz type activities are favoured when integrated into learning over didactic style lecture delivery (Verma et al., 2024). They enable learners to check their progress and integrate the focus on names of structures and their function in smaller parts, rather than all in one didactic block. Additionally, the value of educational games has been demonstrated in children who are attending asthma clinics, with positive knowledge gain in 84% of outcome measures assessed, which in turn can reduce morbidity risk from understanding correct condition management (Rubin et al., 1986). Most recent developments are also seeing the introduction of artificial intelligence into anatomical education through gamification. These studies reinforce the benefits of gamification on anatomical learning as well as using the virtual assistant to direct students to areas where further student learning is required (López-Jiménez et al., 2021; Castellano et al., 2024). Educational value is also significantly improved, along with student feedback when outcomes and student feedback is incorporated into subsequent learning resources.

When considering anatomical (and medical) language as “a new language” which given its roots in Latin and Greek seems reasonable, you can view a student's learning journey as one of learning a new language, given the hundreds, if not thousands of anatomical and medical terms they will learnt over the course of their studies and continue to do so as part of their ongoing training (Tabor E, 2023). Apps which teach new languages, such as Duolingo, have shown positive effects on language learning and potential in health education (Tackett et al., 2019).

This gives clear evidence and hope that integrating games and quizzes into public engagement will have a positive impact on language knowledge, in the same way that it is proving to be a positive resource in formal and informal anatomy learning fora.

The power of a good story

Narratives are a valuable and versatile addition to any science communicator's toolkit. Dudley et al. found that narrative was more effective than didactic communication strategy at conveying scientific and health content to public audiences in fifty out of seventy-eight papers (64%) reviewed (Dudley et al., 2023). Additionally, audiences receiving information in narrative form are more likely to remember details (Fisher and Radvansky, 2018), so useful and relevant anatomical knowledge can be woven into a story of how an anatomical structure received its name. It is also important to highlight that narratives have been found to be effective on audiences with limited health literacy (Jiang, 2021) thus, anatomists should focus particularly on incorporating various elements of narrative story telling into their outreach activities (ElShafie, 2018).

A fun example of etymological narrative can be found with the sartorius muscle, whose name belongs (by virtue of a good story) in the **function** category of naming. The sartorius muscle crosses the hip and knee joints, acting to flex both joints and laterally rotating the hip. The synergistic combination of these actions is crucial to assuming a cross-legged position; a position tailors typically assume when sewing in the canvas of a bespoke suit. In Latin, *Sartor* means tailor and so the muscle's name is linked to its applied function. This etymology has also been applied to the English word "Sartorial"; an adjective that relates to clothing and is generally used to denote that someone dresses well (i.e., their clothes are tailor-made). These elements related to the sartorius muscle can be combined to produce a story underlying the muscle's etymology while also capturing its function in a memorable narrative. Whether within a

structure's etymological origins, or otherwise, there is no shortage of opportunities within the vast field of anatomy to craft an education tale that remains with the audience.

The taboo subjects – using humour to build rapport.

Returning to focus on naming anatomical structures for their visual similarity to other things, it is interesting to observe that there is an abundance of structures named for their resemblance to breasts or nipples. In some cases, the rationale for such nomenclature is readily apparent, as exemplified by the mammillary bodies on the base of the brain (Latin *mamila* for little breast). However, in other cases, the justification for such terminology requires a more substantial leap of imagination to see the resemblance and to believe that there were no better options. Examples of this include the mastoid process (Greek *mastoeides* for breast like) and the papillary muscles of the heart (Latin *papilla* for nipple).

From a public engagement perspective, this wealth of structures carrying names related to breasts and nipples presents a valuable two-step opportunity to meaningfully connect with audiences. Firstly, and most simply, by leaning into the juvenile humour surrounding the overactive imaginations of the anatomists who established anatomical nomenclature in the 16th and 17th centuries. When done respectfully, humour directly associated with scientific content can be highly effective at maintaining audience engagement (Cacciatore et al., 2020; Erdoğan and Çakiroğlu, 2021). The second, and most important step of this engagement opportunity hinges on this use of humour to build rapport between presenter and audience. Using humour has been shown to increase audiences' help-seeking behaviour relating to stigmatized symptoms and health conditions (Miller et al., 2021), and once rapport is established, audiences may be more receptive to discussing topics considered sensitive or taboo. It is well recognised that the public can be reticent to engage with health screening campaigns or reporting symptoms for conditions related to genitalia (Lee and Cody, 2020; Peterson et al., 2021; Foster et al., 2023).

By openly acknowledging and speaking about genitalia in anatomy outreach, members of the audience may then feel more open to speaking to their doctors about issues and be able to use and understand the associated anatomical language. They might also directly engage in dialogue with the presenter, who could encourage them to consult a health professional. A key goal of anatomical public engagement is to build public awareness of the body, and in turn influence audience behaviour to improve health outcomes. This is an example of how an anatomist can use humour to establish a relationship with a public audience by drawing on the etymology of anatomical terms, and leveraging this to normalise important conversations that are too often avoided.

It should be noted that any discussion related to the anatomy of genitals must be done in an inclusive manner. It is counterproductive to reduce the stigma related to conditions considered sensitive, and at the same time, disaffect individuals who may be intersex, transgender, or gender diverse. Using person-first, anatomy-based language (e.g., people with a prostate or “the [specific structure]”) rather than binary, sex-based language (e.g., in “males”) allows everyone to discuss anatomy inclusively (Easterling and Byram, 2022). This use of inclusive language has been successfully demonstrated in university learning environments (Lazarus, 2021; Štrkalj and Pather, 2021; Easterling and Byram, 2022; Paterson SI, 2023) and it should be no different when anatomists communicate with public audiences.

Eponyms – out with the old

Finally, no discussion on anatomical language would be complete without exploring **eponyms**. Eponyms are identifying terms usually derived from the name of a person. Commonly used examples in anatomy include the Achilles tendon, Circle of Willis, Fallopian tube, and McBurney’s point. Unlike the aforementioned naming conventions based on Greek and Latin words, eponymous terms do not provide any information about the structure in question (i.e., function, location, or appearance). Furthermore, all anatomical structures with eponymous names also have formal, internationally agreed upon, descriptive names in the Terminologia

Anatomica (FIPAT, 2019; Waschke, 2024). This duplication of names for a single structure inherently confuses the already daunting language of anatomy. This is just one of the issues that contributes to the ongoing debate within the anatomy discipline regarding the continued use of eponymous terms for anatomical structures (Fargen and Hoh, 2014; Olry, 2014a; 2014b; Ghaznavi, 2021; McNulty et al., 2021; Organ and Mussell, 2021). This paper does not intend to advance this debate in either direction. Rather than asking “*should* eponyms appear in anatomical public engagement?” this paper instead acknowledges that the presence of anatomical eponyms persists, and therefore aims to provide practical guidance for when and how to use eponyms appropriately in anatomy public engagement.

An important reason to use an eponym is if that name is publicly well-known. From our experiences, Fallopian tube (rather than uterine tube) is often recognised by audiences; though some audience members can be surprised to learn that this is an eponymous term (for Gabriele Falloppio). It is incumbent on anatomists who engage the public to meet audiences where they are, and to bridge the gap created by anatomical jargon. Therefore, where there is already public awareness of an eponymous name (even if they are not aware it is an eponym), this can be used as a foundation to introduce the *Terminologia Anatomica* name and grow health literacy.

Anatomical eponyms may also have value as a marker of our field’s history which can be communicated as a narrative. When in vogue, eponyms were used to convey status within the field; for example, anatomists claiming discovery of a structure by assigning it their name, or the name of another person to acknowledge their scientific contribution (Gest, 2014). While eponyms do not always accurately recognise this contribution to knowledge (as discoveries are often the work of teams, rather than individuals), the background details of named individuals lend the science communicator a ready-made story in the form of biography (Dobson, 1962). As described earlier, narratives are a powerful communication tool that should not be underestimated. However, caution should be taken when using eponyms as a basis for narrative,

as there are profound ethical concerns about the actions or beliefs of some persons who have lent their name to anatomical structures (Woywodt et al., 2010). This is not to say they should not be discussed, but rather it is imperative that anatomists are aware of such examples and have the communication skills necessary to discuss them appropriately and sensitively. Organ and Mussell made the case that eponyms can be used to teach bioethics in the anatomy classroom, and this can apply to the public arena as well (Organ and Mussell, 2021). Depending on the focus of the outreach activity, eponyms might be included to call attention to abhorrent transgressions that have underpinned some anatomical knowledge, with an emphasis on the bioethical implications and corrections that the field has undergone since. By openly acknowledging the sinister aspects of anatomy's history, anatomists have the opportunity to demonstrate accountability on the discipline's behalf and take steps to actively (re)gain public trust in anatomy, and medicine, more widely.

Another key concern for the ongoing use of eponyms is the lack of diversity in the exclusive group for whom anatomical structures share a name (McNulty, et al., 2021). Within the field of medicine specifically, eponymous terms for clinical conditions and procedures continue to be created. Since the turn of the century, the percentage of women in medicine closely matches the proportion of new medical eponyms attributed to women (Stuart-Smith, 2022). However, this gender balance within the medical field is only recent, and the propensity for ascribing eponymous terms in the 18th and 19th centuries means that only 4% of all medical eponyms are attributed to women (Stuart-Smith, 2022). This discrepancy is exacerbated when examining anatomical eponyms. The discovery of new anatomical structures has been exceedingly rare in the past hundred years, and so eponymous terms associated with women and people from minoritized groups are few and far between in anatomy. Indeed, the only structure that comes to mind is the eye's Iris, named for the Greek *mythological* figure. Eponyms in the anatomical context are also uniquely problematic. There are many commonplace eponyms that feature in our everyday language related to objects and concepts (e.g., Caesar salad, degrees Fahrenheit,

Pandora's box, etc.) separate from the body. In contrast, giving parts of the body eponymous names implies ownership of the structure. As such, anatomical eponyms are particularly contentious when men's names have been used to identify structures only found in the anatomy of people with a uterus (e.g., Fallopian tube, pouch of Douglas, Bartholin glands) (Kaminsky, 2018). In this context, eponyms bolster patriarchal and colonial narratives around bodily autonomy, regardless of whether one is aware that the name is eponymous. Indeed, through this lens, anatomists have the opportunity (and responsibility) to demonstrate for public audiences the connections between anatomical language and current socio-political discourse around gender equality and decolonization (Finn et al., 2022; Smith, 2022). Furthermore, this facilitates a core facet of scientific public engagement; the co-creation of understanding by experts and the public which has the potential to advance positive changes socially and within the discipline (Engage2020, 2014).

Overall, while the use of eponyms remains contentious, they provide valuable opportunities for anatomists to engage with the public in discussions that use anatomical language as a tool with which to interrogate our history to start making sense of the present.

Summary

With the importance of understanding anatomical language being highlighted through various modalities in this article, it is important to try and begin to incorporate the solutions to problems when working with public audiences of all ages. It is also important that as anatomy educators, we give future anatomists and healthcare professionals the tools to do the same. It is recognised that in health focussed courses anatomical language becomes a familiar medium of communication, but little focus is given to what the words mean. If an understanding of this language was incorporated into the learning, it might make it easier for this to be translated back to patients in their clinical contact. Combining this with a better understanding of basic anatomy for the public/patient side has the potential to yield benefits to patients as well as healthcare systems. Indeed, by having a focus on names and structures, knowledge becomes

more accessible to the public, who may pick up and retain small but life changing pieces of information about structures in their own body.

To finish, a key indicator of outreach success is to inspire an ongoing curiosity for the subject in members of the audience. To take their knowledge further, there are pre-existing, public-facing, anatomical language resources that anatomists can sign-post to a curious audience including books and games (Brassett C, 2017; Roberts, 2022; Moyes, 2023). Whether delivering a talk specifically on anatomical terminology or breaking down anatomy jargon as part of a larger activity, do consider wielding powerful engagement tools such as games, humour, and narratives; all of which have the potential to not only deliver information in a way more likely to be retained, but also to strengthen your relationship with the audience. Building on this, translating anatomical terminology related to sensitive topics and eponyms is an invaluable opportunity to demonstrate the links between anatomy and wider socio-political and bioethical discourse, setting the stage for co-creation of understanding and strengthening the links with our wider communities.

Notes on contributors

Kat A. Sanders, BHealthSci(Hons), PhD, FAS, SFHEA, PGCAP, is Associate Professor in Anatomy at the University of Sydney, Australia. As a sartorially dressed and anatomically lexical science communicator, Kat has a track record of delivering public talks aimed at demystifying the language of anatomy. In addition, they are the co-founder of the international program of Anatomy Nights events. Their research interests include anatomical education, science communication, and clinical anatomy. ORCID: 0000-0003-0838-0936

Adam M. Taylor, BSc(Hons), PhD, FAS, SFHEA, NTF, is Professor in Anatomy, Lancaster Medical School, Faculty of Health and Medicine, at Lancaster University, Lancaster, UK. He teaches embryology, microscopic, and gross anatomy to first-, second-, and third-year medical and biomedical students. His research interests include gross anatomy, public engagement, microscopic anatomy, medical education, and medical history. He has a substantial engagement portfolio including one of the world's leading writers for The Conversation. ORCID: 0000-0002-4084-0456

References

- Brassett C EE, Fey I. 2017. *The secret language of Anatomy*. 1 Edition.: Tien Wah Press.
- Cacciatore M, Becker A, Anderson A, Yeo S. 2020. Laughing With Science: The Influence of Audience Approval on Engagement. *Science Communication* 42:107554702091074. doi: 10.1177/1075547020910749).
- Castellano MS, Contreras-McKay I, Neyem A, Farfán E, Inzunza O, Ottone NE, del Sol M, Alario-Hoyos C, Alvarado MS, Tubbs RS. 2024. Empowering human anatomy education through gamification and artificial intelligence: An innovative approach to knowledge appropriation. *Clin Anat* 37:12-24. doi: <https://doi.org/10.1002/ca.24074>).
- Cheung RCC, Chen B, Ho CCJ, Tipoe George L, Yang J. 2023. “Where is the spleen? Where are the lungs?”—An investigation of the level of anatomical knowledge of the Hong Kong public. *Anatomical Sciences Education* 16:1209-1217. doi: 10.1002/ase.2318).
- Dickson KA, Stephens BW. 2015. It's all in the mime: Actions speak louder than words when teaching the cranial nerves. *Anat Sci Educ* 8:584-592. doi: 10.1002/ase.1531).
- Dobson J. 1962. *Anatomical Eponyms: Being a Biographical Dictionary of Those Anatomists Whose Names Have Become Incorporated Into Anatomical Nomenclature, with Definitions of the Structures to which Their Names Have Been Attached and References to the Works in which They are Described*. 2 Edition.: E & S Livingstone, Ltd.
- Dudley MZ, Squires GK, Petroske TM, Dawson S, Brewer J. 2023. The Use of Narrative in Science and Health Communication: A Scoping Review. *Patient Educ Couns* 112:107752. doi: 10.1016/j.pec.2023.107752).
- Easterling L, Byram J. 2022. Shifting language for shifting anatomy: Using inclusive anatomical language to support transgender and nonbinary identities. *The Anatomical Record* 305:983-991. doi: <https://doi.org/10.1002/ar.24862>).
- Education Df. 2021. Thousands more students to learn ancient and modern languages.
- ElShafie SJ. 2018. Making Science Meaningful for Broad Audiences through Stories. *Integr Comp Biol* 58:1213-1223. doi: 10.1093/icb/icy103).
- Engage2020. 2014. Public Engagement in R&I processes – Promises and Demands
- Erdoğan F, Çakıroğlu Ü. 2021. The educational power of humor on student engagement in online learning environments. *Research and Practice in Technology Enhanced Learning* 16:9. doi: 10.1186/s41039-021-00158-8).
- Fargen KM, Hoh BL. 2014. The debate over eponyms. *Clin Anat* 27:1137-1140. doi: 10.1002/ca.22409).
- Finn GM, Danquah A, Matthan J. 2022. Colonization, cadavers, and color: Considering decolonization of anatomy curricula. *The Anatomical Record* 305:938-951. doi: <https://doi.org/10.1002/ar.24855>).
- FIPAT. 2019. *Terminologia Anatomica Second Edition (2019) International anatomical terminology*. . URL: <https://fipat.library.dal.ca/TA2/> [accessed.
- Fisher JS, Radvansky GA. 2018. Patterns of forgetting. *Journal of Memory and Language* 102:130-141. doi: 10.1016/j.jml.2018.05.008).
- Foster P, Luebke M, Razzak AN, Anderson DJ, Hasoon J, Viswanath O, Kaye AD, Urits I. 2023. Stigmatization as a Barrier to Urologic Care: A Review. *Health Psychol Res* 11:84273. doi: 10.52965/001c.84273).
- Garner R. 2014. Latin makes surprising comeback in state schools. *The Independent*.
- Gest TR. 2014. Anatomical nomenclature and the use of eponyms. *Clin Anat* 27:1141. doi: 10.1002/ca.22407).
- Ghaznavi K. 2021. Eponyms have a place in the anatomy classroom. *Anatomical Sciences Education* 14doi: 10.1002/ase.2115).
- Ghosh SK. 2015. Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anat Cell Biol* 48:153-169. doi: 10.5115/acb.2015.48.3.153).

Jiang LC. 2021. Effects of narrative persuasion in promoting influenza vaccination in Hong Kong: A randomized controlled trial. *Patient Educ Couns* 104:800-807. doi: 10.1016/j.pec.2020.09.025).

Kaminsky L. 2018. From fallopian tubes to the Pouch of Douglas, women's body parts have been named by and after men. But the masculine language of medicine doesn't end there. Does it matter? . *BBC Future – The Health Gap*. 4 June 2018. , URL: <https://www.bbc.com/future/article/20180531-how-womens-body-parts-have-been-named-after-men> [accessed 18th October 2024].

Lazarus M, Sanchez, A. 2021. Redefining anatomical language in healthcare to create safer spaces for all genders. . *LENS*, URL: <https://lens.monash.edu/2021/05/17/1383207/redefining-anatomical-language-in-healthcare-to-create-safer-spaces-for-all-genders> [accessed 18th October 2024].

Lee ASD, Cody SL. 2020. The Stigma of Sexually Transmitted Infections. *Nurs Clin North Am* 55:295-305. doi: 10.1016/j.cnur.2020.05.002).

López-Jiménez JJ, Fernández-Alemán JL, García-Berná JA, López González L, González Sequeros O, Nicolás Ros J, Carrillo de Gea JM, Idri A, Toval A. 2021. Effects of Gamification on the Benefits of Student Response Systems in Learning of Human Anatomy: Three Experimental Studies. *Int J Environ Res Public Health* 18:13210.

Martin LR, Williams SL, Haskard KB, Dimatteo MR. 2005. The challenge of patient adherence. *Ther Clin Risk Manag* 1:189-199.

McMillan I. 2015. *Transformatio Per Complexitatem: The 20th Century Transformation of Latin Teaching in the UK*. *Journal of Classics Teaching* 16:25-32. doi: 10.1017/S2058631015000161).

McNulty MA, Wisner RL, Meyer AJ. 2021. NOMENs land: The place of eponyms in the anatomy classroom. *Anat Sci Educ* 14:847-852. doi: 10.1002/ase.2108).

Miller E, Bergmeier HJ, Blewitt C, O'Connor A, Skouteris H. 2021. A systematic review of humour-based strategies for addressing public health priorities. *Aust N Z J Public Health* 45:568-577. doi: 10.1111/1753-6405.13142).

Moyes S, Chilton, J. 2023. Wordotomy. *Focus Games* URL: <https://wordotomy.com>. [accessed 03/02/25 2025].

Neder JA. 2020. Cardiovascular and pulmonary interactions: why Galen's misconceptions proved clinically useful for 1,300 years. *Adv Physiol Educ* 44:225-231. doi: 10.1152/advan.00058.2020).

Olry R. 2014a. Anatomical eponyms, part 1: To look on the bright side. *Clin Anat* 27:1142-1144. doi: <https://doi.org/10.1002/ca.22426>).

Olry R. 2014b. Anatomical eponyms, Part 2: The other side of the coin. *Clin Anat* 27:1145-1148. doi: <https://doi.org/10.1002/ca.22439>).

Organ JM, Mussell JC. 2021. A case for using eponyms in anatomy to teach bioethics. *Anat Sci Educ* 14:859-861. doi: 10.1002/ase.2123).

Paterson SI SM. 2023. Rethinking sex and gender within anatomy teaching [abstract 24]. Abstracts Presented at the Summer Meeting of the British Association of Clinical Anatomists on 6th July 2023, at the School of Anatomy, University of Bristol, Bristol, United Kingdom. *Clin Anat*:E51-e60. doi: 10.1002/ca.24131).

Peterson CE, Silva A, Goben AH, Ongtengco NP, Hu EZ, Khanna D, Nussbaum ER, Jasenof IG, Kim SJ, Dykens JA. 2021. Stigma and cervical cancer prevention: A scoping review of the U.S. literature. *Prev Med* 153:106849. doi: 10.1016/j.ypmed.2021.106849).

Peterson SN. 2017. Using a Modified Version of Pictionary to Help Students Review Course Material. *J Microbiol Biol Educ* 18doi: 10.1128/jmbe.v18i3.1375).

Roberts A. 2022. *Anatomical oddities*. 1 Edition.: Simon and Schuster.

Rubin DH, Leventhal JM, Sadock RT, Letovsky E, Schottland P, Clemente I, McCarthy P. 1986. Educational intervention by computer in childhood asthma: a randomized clinical trial testing the use of a new teaching intervention in childhood asthma. *Pediatrics* 77:1-10.

Sakai T. 2007. Historical evolution of anatomical terminology from ancient to modern. *Anat Sci Int* 82:65-81. doi: 10.1111/j.1447-073X.2007.00180.x).

Sanders KA, Philp JAC, Jordan CY, Cale AS, Cunningham CL, Organ JM. 2022. Anatomy Nights: An international public engagement event increases audience knowledge of brain anatomy. *PLoS One* 17:e0267550. doi: 10.1371/journal.pone.0267550).

Shahid R, Shoker M, Chu LM, Frehlick R, Ward H, Pahwa P. 2022. Impact of low health literacy on patients' health outcomes: a multicenter cohort study. *BMC Health Serv Res* 22:1148. doi: 10.1186/s12913-022-08527-9).

Smith TC. 2022. Re-examining our roots: Queer history and anatomy. *Anat Rec (Hoboken)* 305:968-982. doi: 10.1002/ar.24859).

Štrkalj G, Pather N. 2021. Beyond the Sex Binary: Toward the Inclusive Anatomical Sciences Education. *Anat Sci Educ* 14:513-518. doi: 10.1002/ase.2002).

Stuart-Smith J, Scott, K., Johnston M. 2022. Where are all the women? . *Life in the Fastlane*, URL: <https://litfl.com/where-are-all-the-women/#2-definitions> [accessed 18th October 2024 2024].

Svendsten MT, Bak CK, Sørensen K, Pelikan J, Riddersholm SJ, Skals RK, Mortensen RN, Maindal HT, Bøggild H, Nielsen G, Torp-Pedersen C. 2020. Associations of health literacy with socioeconomic position, health risk behavior, and health status: a large national population-based survey among Danish adults. *BMC Public Health* 20:565. doi: 10.1186/s12889-020-08498-8).

Tabor E. 2023. Learning the vocabulary of medicine (and other foreign languages). URL: <https://hekint.org/2023/01/31/learning-the-vocabulary-of-medicine-and-other-foreign-languages/> [accessed 03/02/25 2025].

Tackett S, Gaglani S, Heilman J, Azzam A. 2019. The reCAPTCHA of medical education. *Med Teach* 41:598-600. doi: 10.1080/0142159X.2018.1460463).

Taylor AM, Diggle P, Wessels Q. 2018. What do the public know about anatomy? Anatomy education to the public and the implications. *Anat Sci Educ* 11:117-123. doi: 10.1002/ase.1746).

Taylor AM, Wessels Q. 2024. "Spine to the future"-A narrative review of anatomy engagement. *Anat Sci Educ* 17:735-748. doi: 10.1002/ase.2417).

Turmezei TD. 2012. The linguistic roots of Modern English anatomical terminology. *Clin Anat* 25:1015-1022. doi: 10.1002/ca.22062).

Verma A, Pasricha N, Chaudhary A, Bhatnagar R, Sthapak E, Gaharwar A. 2024. Interactive Quiz-Based Anatomy Teaching for Medical Undergraduate Students. *Cureus* 16:e52353. doi: 10.7759/cureus.52353).

Waschke J. 2024. Terminologia anatomica: evolution but not revolution. *Anatomical Science International* 99:357-360. doi: 10.1007/s12565-024-00760-y).

Williams MV, Parker RM, Baker DW, Parikh NS, Pitkin K, Coates WC, Nurss JR. 1995. Inadequate Functional Health Literacy Among Patients at Two Public Hospitals. *JAMA* 274:1677-1682. doi: 10.1001/jama.1995.03530210031026).

Woywodt A, Lefrak S, Matteson E. 2010. Tainted eponyms in medicine: the "Clara" cell joins the list. *Eur Respir J* 36:706-708. doi: 10.1183/09031936.00046110).

YetiGames. Organ Attack. URL: <https://theawkwardyeti.com/games/> [accessed October 20th 2023 2023].