

# Medical Humanities and Their Discontents: Definitions, Critiques, and Implications

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## Abstract

The humanities offer great potential for enhancing professional and humanistic development in medical education. Yet, although many students report benefit from exposure to the humanities in their medical education, they also offer consistent complaints and skepticism. The authors offer a pedagogical definition of the medical humanities, linking it to medicine as a practice profession. They then explore three student critiques of medical humanities curricula: (1) the content critique, examining issues of perceived relevance and intellectual bait-and-switch, (2) the teaching critique, which examines instructor trustworthiness and perceived

personal intrusiveness, and (3) the structural/placement critique, or how and when medical humanities appear in the curriculum. Next, ways are suggested to tailor medical humanities to better acknowledge and reframe the needs of medical students. These include ongoing cross-disciplinary reflective practices in which intellectual tools of the humanities are incorporated into educational activities to help students examine and, at times, contest the process, values, and goals of medical practice. This systematic, pervasive reflection will organically lead to meaningful contributions from the medical humanities in three specific areas of great interest to medical educators:

professionalism, "narrativity," and educational competencies. Regarding pedagogy, the implications of this approach are an integrated required curriculum and innovative concepts such as "applied humanities scholars." In turn, systematic integration of humanities perspectives and ways of thinking into clinical training will usefully expand the range of metaphors and narratives available to reflect on medical practice and offer possibilities for deepening and strengthening professional education.

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**A**s any medical educator will tell you, it is in the nature of medical students to complain about their curriculum.<sup>1–3</sup> The medical humanities receive more than their fair share of students' critiques in terms of both quantity and virulence. Although the majority of students' comments are supportive and positive, many refer to humanities teaching as pointless, boring, worthless, or just plain stupid.<sup>4</sup> Even otherwise favorably disposed students are sometimes adamant about not making medical

humanities required coursework. This situation leads us to ask, Why does humanities teaching regularly engender not just legitimate criticism, but outpourings of anger and contempt?

In this article, we offer a pedagogical definition of medical humanities, describe their potential contributions to the medical education enterprise, identify major critiques of the medical humanities from learners' perspectives, and offer suggestions for systemic pedagogical responses to address these critiques.

## A Pedagogical Definition of Medical Humanities

Despite ongoing lack of clarity on what exactly the medical humanities comprise, and how they should be integrated into medical education,<sup>5</sup> medical humanities teaching activities share several characteristics:

1. They use methods, concepts, and content from one or more of the humanities disciplines to investigate illness, pain, disability, suffering, healing, therapeutic relationships, and other aspects of medicine and health care practice.

2. They employ these methods, concepts, and content in teaching health professions students how to better understand and critically reflect on their professions with the intention of becoming more self-aware and humane practitioners.
3. Their activities are interdisciplinary in theory and practice and necessarily nurture collaboration among scholars, healers, and patients.

Conditions 1 and 2 imply that medical humanities have a significant *moral* function.<sup>6–9\*</sup> That is, an important goal of medical humanities is to reconceptualize health care, through influencing students and practitioners to query their own attitudes and behaviors, while offering a nuanced and integrated perspective on the fundamental aspects of illness, suffering, and healing. In Aristotelian terms,<sup>11</sup> medical humanities aim to improve health care (*praxis*) by influencing its practitioners to refine and complexify their judgments (*phronesis*) in clinical situations, based on a deep and

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\* Following Friedman,<sup>10</sup> we see medical humanities and bioethics having equally valuable but essentially different ways of analyzing information, viewing the world, confronting dilemmas, and teaching students.

complex understanding (*sophia*) of illness, suffering, personhood, and related issues. In this respect, medical humanities have a more applied function than the humanities as they are traditionally defined in the academy.

Nevertheless, despite the substantial promise of the medical humanities during the past 35 years and compelling evidence of their significance for medical education,<sup>12–14</sup> the incorporation of medical humanities in medical training has not proceeded smoothly. By and large, medical humanities remain an intriguing sideline in the main project of medical education.<sup>15</sup> Below, we consider major critiques of medical humanities curricula that we have heard from learners and those critiques' implications for the relationship between the humanities and medical education.

### Learners' Critiques of Medical Humanities Curricula

Critiques of medical humanities may be grouped as responses to three broad questions: (1) Is the content irrelevant? (2) Are humanities teachers and their methods the problem? (3) Is the positioning of humanities coursework within the curriculum inappropriate?

#### Is it the content?

**The relevance critique.** This critique acknowledges that the humanities may be important to future physicians in some indirect way, but it asserts that the material is impractical. The humanities can't provide student physicians with concrete skills (such as learning how to start an IV) that are useful in clinical practice. How does reading a poem help the student measurably improve the treatment of patients? When one of us (J.C.) first introduced topics such as interviewing, clinical ethics, and medical humanities, some students found the material simplistic, commonsense, uninteresting, and—worst of all—irrelevant.<sup>16</sup>

At the medical school of another one of us (M.M.), first- and second-year students were polled after their courses to assess, among other things, whether the humanities material presented in lecture, readings, and small-group discussion was “clinically relevant.” Results showed that almost half of the students gave the humanities material moderately low

ratings for “clinical relevance”; the remainder of the students gave the material more positive ratings. A study examining possible outcomes of students' exposure to poetry reading during an interstation break of a third-year OSCE indicated little or no effect in up to one third of respondents in terms of influencing treatment, increasing empathy, or improving stress.<sup>17</sup> A kinder, gentler version of the relevance critique affirms the “niceness” of the humanities, as in “It's a nice change of pace from pathophysiology” or “It's very relaxing.” This modification assumes that the medical humanities are enjoyable but not crucial to the education of physicians. In either case, both anecdotal and investigational data suggest that medical humanities faculty have failed to adequately convince students that the medical humanities really matter to them as future physicians.

**Intellectual bait-and-switch.** Most students enter medical school having internalized the view that medicine is an objective, scientific pursuit based almost exclusively on factual knowledge and technical skills. This perspective is understandable because it reflects the prevalent image of medicine in American culture<sup>18</sup> and is reinforced by the narrow prerequisites of premedical majors and entry requirements for medical school that prioritize quantitative and scientific performance. In medical training, it is reinforced by basic science courses and, later, a hospital culture that often eschews patient-centered or relationship-based medicine in favor of technical expertise.<sup>19,20</sup> One of us (M.M.) recalls a student complaining bitterly about a narrative writing assignment about patients. Why should he be “forced to write a story?” He “didn't come to medical school to be a writer.” This young man and students like him feel a sense of grievance: it's unfair to be evaluated in an area they hadn't expected to be part of their curriculum.

**The preference for “elective” humanities.** One of the symbolic manifestations of “irrelevance” and “intellectual bait-and-switch” complaints is the persistent resistance to required curriculum in the humanities. One of us (D.W.) recounts a typical incident:

A student and I were talking about a required Reflections on Doctoring class

that focuses on topics most often illuminated by a short story, poem, or essay. The young man told me how much he liked the class, that is, *really* liked it, but that “a lot” of students did not and wondered if it wouldn't be better as an elective. “Of course, I'd take the course if it were elective and I know a lot of students would, but it would relieve those who aren't interested or who are too busy to come to class. . . . We're all so busy.”

Because medical humanities are a domain outside the basic and clinical sciences, some students believe that one must have an interest in or affinity for them, a bit like the elective system in the final year of medical school. This assumption guarantees a peripheral role for the humanities in the curriculum.

#### Is it the teachers and their methods?

**The trustworthiness critique.** In medical education, the current process of socialization encourages a reliance on insiders (physicians) and distrust of outsiders (nonphysicians). There is a widespread perception that nonphysicians do not comprehend clinical realities. Students object that humanities instructors lack professional training or experience in medicine. They aren't doctors, and only doctors can train medical students in clinical skills. Thus, to many students, medical humanities teachers seem to talk the talk without walking the walk.

**The therapeutic critique.** Humanities-based exercises frequently ask students to reflect on their own values, attitudes, and behavior, as well as on issues of subjectivity, multiple truths, and ambiguity through the filters of poems, stories, artwork, or music.<sup>21–25</sup> Students often resist this personal engagement as excessively intimate and intrusive. Indeed, the very “softness” of the humanities can pose a threat to students by forcing them to examine their own vulnerability and uncertainty. Being asked to write, either about their own experiences or about those of patients, or even being asked to offer opinions about a poem or painting, can generate anxiety because no universally agreed-upon right answer exists. Instead, they must use their own powers of observation, insight, and intellectual and emotional connections as the bases for their responses. Equally disconcerting, humanities instructors often say, “I don't know, what do you think?” thus

questioning the foundational expertise that medical students have learned to expect from their teachers. Perhaps most alarming, “real” teachers, such as basic science faculty, overworked residents, and multitasking attending physicians seem to studiously avoid such subjectivity and lack of uncertainty.

Along these lines, some students perceive that humanities courses attempt character formation, and they believe their own characters not to be in need of further formation. One of us recently carried out a study<sup>26</sup> in which a quarter of participating fourth-year students believed that their medical education had little or no effect on their conceptions of and capacity for compassion, altruism, and respect for patients. Such students feel pressured by humanities courses to somehow become more humanistic when, in fact, they believe qualities of humanism are already formed and unchangeable.

#### Is it the placement in the curriculum?

**The structural critique.** Medical humanities are often criticized for inefficiency and improper placement in the curriculum. With regard to inefficiency, students seem to adopt the Rule of Halves: however many hours or seminars are assigned to the humanities, they say the program would be more effective (and more highly rated by students) if it were taught in half the time. Students make a compelling argument that the less humanities teaching they are exposed to, the more they would learn. Another version of the structural critique is the Content Catch 22. In this case, if the humanities curriculum includes high content (dense lectures, lots of reading), it is criticized for overwhelming students. On the other hand, if it includes low content (small groups, process oriented), it is criticized for being vague, open ended, and too personal.

A related argument is that the humanities are not properly positioned in the curriculum. Appearing in the first year, they are too far removed from the clinical setting. In the second year, they compete with preparation for the boards (on which they are not represented). In the third year, students are overwhelmed trying to master basic clinic medicine and, therefore, are less responsive to humanities teaching. In the fourth year,

students frequently disappear to away-rotations. It may seem that the best place to introduce medical humanities is nowhere.

#### A Meaningful Conceptual Response

Underlying all of these specific student criticisms is the larger problem of how certain biomedical narratives are privileged,<sup>27</sup> which in turn influences what can be legitimately incorporated in the curriculum and what can be excluded. The prevailing metaphors of medical education continue to be heavily mechanistic (the body is a machine), linear (find the cause, create an effect), and hierarchical (doctor as expert),<sup>28,29</sup> while its dominant narrative tends to be a story of restitution (patient becomes ill; patient is cured by physician expert; patient is restored to preillness state).<sup>30</sup> Exclusive reliance on these metaphors and narratives, with little space to acknowledge or explore others,<sup>31,32</sup> marginalizes the humanities, which don't neatly conform to this cultural model. So, how can we work to change such elusive abstractions as metaphor and narrative?

#### Training cross-disciplinary reflection about medicine

Surprisingly, little curricular time currently is devoted to training students to think about the practice of medicine, to help them examine the process of doctoring as well as its outcomes. What is it that doctors do? What *should* doctors do? How do different people experience the same illness? How do doctors learn to care for patients as persons? How do doctors interface with the larger society?<sup>10</sup> Doctors—and students—tend not to ask such meta-questions, as if by and large they consider medicine a-theoretical, a permanent “Truth” with a capital T, a constant reality that simply *is*. Of course, this is not to say that medicine has not been extensively and insightfully theorized, from biopsychosocial,<sup>33</sup> phenomenological,<sup>34</sup> postmodern,<sup>14,35</sup> feminist,<sup>36,37</sup> and narrative<sup>38–40</sup> perspectives. Nonetheless, such theorizing seems to bear little relationship to day-to-day medical education or clinical practice. We believe that this needs to change.

Despite the dominance of technical, rational, and efficiency-based priorities in contemporary medicine and medical

education, the culture of medicine is not a monolithic entity and no longer speaks with a single voice. For example, a recent study<sup>41</sup> concluded that although many physicians responded to the term “medical humanities” with reactions of uncertainty or even contempt, in fact the goals of medical humanities—particularly those involving increased personal and professional awareness and self-critique—and the goals of the physicians interviewed in terms of fostering professionalism and professional identity, were very similar. This suggests an underlying commonality of interest uniting medical humanities and medicine. Within our own and other institutions of medical learning, many reflective physicians and other medical educators are eager, and indeed have already been working, to engage in activities to promote an expanded vision of medicine and medical education beyond the instrumental. These nascent changes in conceptualizing and contextualizing medicine, if embraced by educational structures, should be nurtured and enlarged.

What we hope future educational initiatives will acknowledge in a substantive, systematic way is just how close to the heart of medicine the humanities lie. Essentially, the humanities focus on the study of those subjects that lead to a better understanding of the human condition.<sup>42</sup> Medicine necessarily engages with almost every aspect of the human condition. In this respect, the humanities are not *additive* to medicine, which implies that medicine has become somehow *deficient*.<sup>43</sup> Rather, as Bishop<sup>44</sup> suggests, we should be working toward abandoning the instrumental thinking that humanities inquiry is *compensatory* to the “biologism of the scientists.” It may be more accurate to say that the humanities can offer medical students additional intellectual tools to help recontextualize their profession in a way that more fully honors its complexity, nuance, ambiguity, and possibility.

In the past decade or so, the concept of reflective practice has penetrated the medical school curriculum through sessions in which humanities scholars, physicians, and medical students interact to more critically understand their own and patients' experiences in health care.<sup>45–47</sup> Reflective writing and

journaling further supplement discussion as a reflective exercise.<sup>48</sup> Engendering self-reflection in students will likely legitimate multiple ways of identifying and evaluating medical knowledge and skills beyond the purely technical.<sup>49,50</sup> In particular, it can help medical humanities educators focus their efforts on three crucial aspects of medical education, namely developing medical professionalism, understanding the narrative dimension of doctoring, and critically questioning the current emphasis on competency-based education.

**Professionalism.** The humanities have important implications for the concept of medical professionalism or, in lay terms, what matters in the making of a physician or, to return to an earlier point, what constitutes authentic relevance to *praxis*. Epstein and Hundert<sup>51</sup> offer a comprehensive definition of professionalism that extends far beyond conventional competency checklists. They include criteria identified more closely with the humanities than with biomedical sciences, such as tolerance of ambiguity and anxiety, observations of one's own thinking, emotions, and techniques, recognition of and response to cognitive and emotional biases, and integrating judgment from multiple sources including the scientific, the clinical, and the humanistic. Of special interest is their inclusion of relational, affective, and moral components, including attentiveness, critical curiosity, self-awareness, and presence, dimensions that legitimize introspective, emotional labor as well as instrumental work<sup>52</sup> and that increasingly are recognized as valuable by other scholars.<sup>53,54</sup> The humanities' recognition of multiple perspectives, priorities, and truths requiring "practice in the negotiation of meanings"<sup>55</sup> as well as the moral implications accompanying this recognition can provide valuable approaches—for example, through supplemental monthly reflection sessions that accompany required clerkships to further develop such habits of mind.

**"Narrativity."** Medical humanities should play an even larger role in teaching *narrativity*, which Charon<sup>56</sup> defines as "the ability to acknowledge, absorb, interpret, and act on the stories and plights of others." The narrative medicine movement reframes many core

doctoring skills under the aegis of language, culture, and story.<sup>56,57</sup> In furthering comprehension of the narrative component of medicine, literary and cultural scholars could contribute to case conferences and other exercises in which students present verbal narratives that explore their developing professional identities. Likewise, they might help design and facilitate curricular opportunities for medical students to write their patients' stories and/or their personal reactions to patients, families, colleagues, and teachers. Medical humanities faculty could also coordinate curricula in which students enhance their narrative understanding through exposure to memoirs, essays, fiction, poetry, and film. Stories about physicians may also contribute to developing professional identity by expanding the student's repertoire of positive and negative physician role models.<sup>58</sup>

**"Humanistic" competencies?** Looking beyond the narrow instrumental focus of medicine would also lead to natural and organic ways of addressing certain recognized clinical competencies that have common sensical links to the medical humanities. Because much of medical education is currently framed in terms of competencies,<sup>59</sup> there is no reason for medical humanities to reflexively resist examining what the profession is trying to achieve through this system of outcomes and measurement. However, such curiosity does not imply that the humanities should unquestioningly further the agenda of the current medical culture. Rather, serious inclusion of medical humanities in conceptualizing the educational process can help the profession think more broadly and creatively about what exactly it is pursuing through its competency orientation.

For example, until now, competencies in areas such as empathy and communication have been defined almost exclusively in checklist-, product-oriented ways (i.e., measurable, observable, and quantifiable behaviors). One contribution to emerge from a mutually respectful dialogue between humanities and medicine would be possibilities for enlarging how to more meaningfully investigate the goals and pursuits that "humanistic" competencies symbolize. Specifically, the humanities

can contribute an understanding of attitudes, knowledge, and behaviors as dialogical, things that come about between human beings in ways that are always incomplete, partial, and inevitably biased. The humanities' tradition of critical inquiry and intellectual skepticism can help medicine move beyond checklists and algorithms to advance analytical and reflective habits of mind in students so that they are better able to think from the perspectives of others, move toward a greater humility, and focus on the values and vision that they brought to medicine in the first place.<sup>60,61</sup> This approach could incorporate the building of student portfolios<sup>62</sup> to provide textured, depth exploration, and demonstration of humanistic values through methods such as critical incident reports<sup>63</sup> and creative projects,<sup>64</sup> as well as the use of "humanistic connoisseurs"<sup>65</sup> to mentor and formatively evaluate learners.

### Pedagogical and Structural Implications

**Integrated, required curriculum.** A broader context within which to understand medicine, to conceptualize and develop professionalism, to appreciate the narrative, story-making component of illness and its treatment, and to revisit the concept of humanistic competencies would also logically lead to an integrated curricular role for the humanities. This approach already has been tried successfully with large numbers of cross-cutting areas, such as behavioral health, communication skills, cultural awareness, palliative care, and geriatrics.<sup>66</sup> Disciplinary divisions still form the underpinnings of the academic community, and this is especially true in medical schools. Nevertheless, at the higher echelons of administration, deans of schools of medicine and schools of humanities and the arts might profitably open dialogues that eventually could lead to shared and funded positions that bridge the arts/science divide.

Locations abound throughout the four-year medical curriculum where humanities-based learning can occur alongside the basic and clinical sciences. Moving away from purely elective formats would be a huge step in diminishing the perception that medical humanities are an add-on, separate from the "real" curriculum. For a significant

systemic change in the culture of academic medicine, faculty allies of the medical humanities must take advantage of the ample and substantive opportunities for meaningful integration in the basic sciences (e.g., end-of-life inquiry in anatomy; film, art, and literary representations of depression, schizophrenia, or autism in neuroscience) and in each of the clinical clerkships (e.g., arts-based sessions to hone observational skills; narrative medicine seminars integrating poetry and prose stories of illness; popular media representations of physicians and patients; relevant historical perspectives in each required specialty; ethical issues from the perspectives of patients as well as physicians and bioethicists).

To some extent, these opportunities already exist in lecture, small-group, and electronic formats. The key emphasis, however, should be on *systemic* application: all these suggestions require buy-in from the leadership on basic science and clinical curriculum committees to prevent the sporadic, in-the-margins enactment of humanities inquiry, which often gives such inquiry its irrelevant, frivolous, why-are-you-wasting-my-time feel for so many students. If humanities analysis can genuinely become part of the everydayness of learning medicine, endorsed by well-positioned, respected faculty, little by little the ubiquitous divide between scientific/clinical medicine and all other domains may be lessened. In such a changed culture, students may begin to recognize and appreciate how meaning making is a lush, complex, and often contradictory undertaking rarely tied to evidence and efficiency in scientific ways, one that honors rather than dismisses subjectivity.

**Integrated role modeling.** It is well established in the research literature that role modeling is among the strongest influences on medical students' learning.<sup>67</sup> Medical humanities faculty can play a key role in helping interested physicians become more effective in manifesting humanistic skills and values in their teaching.<sup>68</sup> Humanities educators can accomplish this informally by serving as role models for clinical faculty, especially in large, required multidisciplinary "patient-doctor" courses, where we coteach or cofacilitate group sessions, and more formally

through medical humanities workshops and retreats for physician faculty. We could consider developing mini-fellowships that focus not only on pedagogy but also on selected knowledge and skills in medical humanities. Even further, we can promote the concept that medical humanities teachers *themselves* serve as role models for students in terms of listening, thinking, resonating emotionally, and being fully present.

**Applied humanities?** It is beyond the scope of this article to address the debate as to whether the humanities should properly focus only on training modes of critical thinking and analysis or whether they should also aim to encourage certain "narrow behaviors or mental attitudes," such as compassion or empathy.<sup>69</sup> However, wading into the shallows of these waters, we offer the concept of the *applied humanities scholar* as a further extension of curricular integration. Evans<sup>70</sup> has usefully distinguished various functions of the medical humanities, including the analysis of the practice of medicine, the moral suasion of medicine, and medical education. Certainly, not all medical humanities educators need to develop applied skills, but like their counterparts in anthropology,<sup>71</sup> some might consider becoming more deeply immersed in the world of illness and its treatment that they study. An applied humanities scholar conceivably could be part of a ward team, whose role would be to ask questions, for example, about the stories being told (or not told), the exercise of power, the way the interaction between doctor and patient might be understood as a kind of dramatic performance, or the aesthetic aspects of the encounter.

### Concluding Thoughts

Our approach to medical humanities teaching addresses students' critiques in a number of ways. First, our call for a cross-disciplinary, collaborative recontextualization of medicine places medical humanities close to the core rather than on the periphery of the profession, and it makes perceptions of irrelevance much more difficult to sustain. Similarly, because professionalism, narrativity, and competencies are concepts currently acknowledged as critical in medical education, focused attention in these domains from the medical humanities

will help these disciplines be seen not only as "nice" but also as essential. Taking seriously the scholarly traditions of the humanities will quickly demonstrate their intellectual challenge, toughness, and rigor and would make students less likely to succumb to intellectual bait-and-switch grievances.

In addition, regular collaboration in teaching, clinical correlates, grand rounds, and other pedagogical exercises, such as those suggested here, need not entail major curricular battles or changes in time allocation. It would also reduce the prevailing insider-outsider distinction that exists between physician and nonphysician faculty and would improve the perceived fidelity and credibility of medical humanities educators. Further, rather than somehow attempting to "produce" humanistic attributes widget-fashion, the kind of mechanical attempts at character formation that students so resent, this approach would instead stimulate thoughtful and disciplined investigation of and dialogue about these concepts and values and perhaps help to stem the moral stagnation and erosion that can occur over the course of training.<sup>72</sup> Required medical humanities curricula would reinforce all these dimensions of relevance, intellectual rigor and value, pedagogical trustworthiness, and moral inquiry.

New metaphors and storylines about the nature of doctoring would also emerge in conjunction with this proposed teaching model. For example, we would likely see inclusion of more types of narratives as acceptable,<sup>73</sup> even desirable, in the practice of medicine. Rather than exclusive reliance on restitution narratives (always welcome when you can get them), with all other narratives seen as synonymous with failure, curiosity about other narrative typologies might begin to surface. Doctors and patients might explore and, in the right circumstances, even welcome *journey narratives*, in which they embark on a rite of passage together. They might become curious about *witnessing narratives*, where the physician accepts that bearing witness to a patient's suffering or final days is a valuable contribution to healing, or even about *transformational narratives*, in which the encounter between doctor and patient changes both of them in multiple ways. Instead of metaphors that

revolve only around mechanical function and its repair, we will begin to hear health professionals—and their ever-attentive students—also using metaphors of growth, organicity, and healing (and other metaphors not yet imagined). In short, we will be able to use the humanities' intricate and sympathetic knowledge about the human condition (*sophia*) as well as its ability to examine particularistic, experiential knowledge (*phronesis*) to help ensure a morally sensitive, narratively sound, and deeply professional clinical practice (*praxis*).

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## Teaching and Learning Moments

### ***Hana No Hana: Artist's Statement***

As assistant director of the Center for Biologic Imaging at the University of Pittsburgh, I am often asked by various clinicians to assist in projects using microscopy to augment their clinical research. B. J. Ferguson, MD, a surgeon in otolaryngology at the University of Pittsburgh Medical Center, invited me to collaborate on a project to identify bacterial biofilms in patients with chronic rhinosinusitis, especially those cases refractory to antibiotic treatment. I was given myriad sinus biopsies from a variety of patients and, after the usual time-consuming processing, I set about looking for bacteria and/or biofilms using transmission electron microscopy. During the many hours I spent at the electron microscope searching for the microbes and biofilm communities, I often came across spectacular scenery through the

oculars. One such frame caught my eye and reminded me of a field of flowers. Sinus epithelium is very specialized and, in its normal state, has both microvilli and cilia decorating the apical plasma membrane surface. This specific section had a nice combination of cilia in cross section and microvilli in longitudinal format, resembling flowers and tall grass, respectively. After taking the frame, the black and white image was pseudocolored to represent the field of flowers I had envisioned, with the cross-sectioned cilia as flowers and the microvilli as grass, all against a blue sky.

My observation of the resemblance between the cilia and microvilli and flowers and grass has been influenced by, of all things, my study of the Japanese language. The Japanese words for flower and nose are

homonyms: *hana*. However, the characters the Japanese use in writing these words are different. The characters written in the lower right-hand corner of the image read "nose flowers" to reflect that the depicted "field of flowers" was derived from a paranasal sinus mucosal biopsy. The final product was meant to loosely represent a Japanese watercolor or woodcut with a title written in Japanese on the print.

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*Editor's Note: This Teaching and Learning Moments essay was contributed as a companion to this month's AM Cover Art selection, which appears on the cover.*