Preparing Hopkins medical students for a career in academic neurosurgery

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DURING THE LAST 15 YEARS, approximately 5 (range, 3 to 12) Hopkins medical students per year have chosen to train in neurosurgery. This success is related in large part to the integration of our department into the medical school experience during each of the four years. The faculty and residents foster students' interests in our field through open and active mentorship in the lecture hall, the research laboratory, the operating room, the hospital wards, and the clinic.

Exposure of medical students to neurosurgery begins aggressively in the first year. Neurosurgeons serve as mentors to a small number of students during their first-year "Introduction to Medicine" course, during which the students shadow their mentors in the clinic and operating room. Our senior faculty gives selected lectures during the first 2 years, including the provision of clinical correlations during anatomy, basic neurosciences, and pathology. During their research years (postgraduate years 5 and 6), our residents are encouraged to serve as teaching assistants in the first-year medical school neuroanatomy and neuroscience laboratories. An enthusiastic resident in such a setting certainly helps cultivate student interest in the neurosciences.

Johns Hopkins Medical School has a grant that funds students to pursue research in the summer between their first and second years. Our actively funded laboratories in the neurosurgical sciences are in the forefront of neurosurgical research and consistently attract 5 to 15 medical students per year. These students spend extensive time in the more relaxed laboratory setting with our residents, who serve as mentors and often encourage them to take clinical elective courses in neurosurgery. Frequently, third- and fourth-year medical students continue working in our departmental laboratories completing projects started earlier or even initiating new projects. Occasionally, students are so taken with this research exposure that they devote an additional year of full-time research in the laboratory. Some first- and second-year medical students are already beginning to formulate their direction toward career decisions. Therefore, exposing the students to the excitement and challenges of neuroscience, the operating room, and the clinic—as well as our residents and faculty at hand—often helps tip their interest toward clinical neurosurgery.

In their third year, students are offered a 2-week rotation in neurosurgery during their required general surgery clerkship as well as during the required neurology and psychiatry rotation. The neurosurgery rotation, which is chosen by approximately half of Hopkins medical students, comprises a formal curriculum with lectures, a reading list, a set of learning objectives, and a written test. Although they are not required to take night call, the students are embraced as active members of the "team" for morning rounds and "scrub-in" for surgery. Those students who develop a special interest in neurosurgery are encouraged to spend 1 month on the adult or pediatric service as a subintern. The subintern is expected to take on the full responsibility of a resident, including night call, and becomes a fully integrated, although closely supervised, member of the team.

Medical students are encouraged to attend our conferences, which include weekly grand rounds, weekly spine conference, and journal clubs held monthly at the homes of our faculty; often the students are invited to present brief talks. Medical students are clearly influenced by interactions they observe while on the clinical service. Our department emphasizes the importance of mutual respect among the faculty, residents, nurses, and

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support staff. Although there is a definite hierarchy, with the residents working under the supervision of faculty, there is also a genuine sense of collegiality in our department. Inappropriate interpersonal interactions are not tolerated. We believe this professional collegiality provides a more productive environment for learning, research, and patient care. The students perceive the genuine excitement and passion our faculty members have for neurosurgery. Each faculty member specializes in a specific area of neurosurgery, which is the focus of both his or her clinical work and research. The students sense the exhilaration of providing outstanding clinical care as well as ideas and solutions to improve neurosurgery.

In summary, our goal has been to expose Johns Hopkins medical students to faculty and residents early in their medical school experience and to offer a wide range of laboratory experience as well, which provides a transition from the preclinical to clinical sciences. Our faculty members work hard to foster these relationships. Students who choose to rotate through the neurosurgical service receive broad exposure to the excitement and challenge of neurosurgery. Those with a potential career interest take the more rigorous clinical elective in neurosurgery, where they learn first-hand about the workload and demands of a busy and intense neurosurgical residency. These multiple opportunities for realistic exposure and authentic experience with neurosurgery have not deterred our students; rather, these opportunities have led a large number of them to choose careers in academic neurosurgery.