

The History of Neurosciences and Neurosurgery in Turkey

Ugur Ture^{1,*}

¹Department of Neurosurgery, Yeditepe University School of Medicine, Istanbul, Turkey

*Corresponding author: UgurTure, Department of Neurosurgery, Yeditepe University School of Medicine, Istanbul, Turkey. Tel/Fax: +90-216-578 4272, E-mail: drture@yahoo.com

Received: February 15, 2015; **Accepted:** February 28, 2015

Keywords: Neurosciences in Turkey; Neurosurgery in Turkey

Neuroscience, among all other disciplines, maybe the topmost field where specialization and sub-specialization increase continuously. As Burton, father of modern biophysics, once pointed out in his article where he was opposing to increasing specialization, that we are learning more and more about less and less (1). It is quite difficult to disagree with the "Burton's Law": However many hens sit on however many eggs for however long, nothing creative will result unless the eggs are fertilized. And Fertilization only occurs when there is interaction between different kinds of fowls. In the last decades the journals tend to represent narrower field of science, which hardly serves the cross fertilization of ideas. The International Neuroscience Journal (INJ) emerges to fill this particular gap in the field of neuroscience. The readers of INJ will be fed with information and ideas from all facets of neuroscience, which, I sincerely believe, will result in new questions to be answered by multidisciplinary researches.

INJ has the word "international" in its title. This is a very critical message. When the biographies of pioneers in neuroscience are studied one can easily detect the significance of educational travelling. Every nation has its own traditions in education and practicing science developed by the long-established customs found in schools. This is strengthened more in the local meetings and congresses. The traditional approach to any branch of science prevents developing new ideas and innovations. I find traveling abroad to observe others extremely essential. To participate in international meetings and courses is another good way to follow world experts. However, just like the journals, national or international, the meetings and congresses are organized on more and more restricted subjects. On the contrary, I believe INJ will become one of the most beneficial journals to track the developments in all of neuroscience in the whole world as well as to share personal experiences with colleagues from all nations. As I mentioned before, all facets of neuroscience are interdependent. Individual progression in one branch cannot be overestimated, but has limited value when it is not paralleled with other branches. Almost every development in

one field should find its own use in other fields of neuroscience.

To contribute to today's literature and plan the future projects in neuroscience, one should study the history of neuroscience. It is every neuroscientist's duty to remember pioneers of the past and to credit them when reporting their own contributions. Throughout the history, Anatolia (Asian part of Turkey) generated many important figures of neuroscience from numerous civilizations. The first sign of neurosurgical intervention in Anatolia discovered so far is the cranium from the Neolithic Age with a large craniectomy in the left posterior frontal region. It seems a sharp chisel-like object was used to produce the hole.

Anatolia hosted one of the earliest civilizations that also revealed great development in science. For example during the era of Hittites (1660-1190 BC), an ancient empire in central Asia Minor, depression, aphasia, blindness, and deafness were explained and terms in Hittites were used to name these. Some of these Hittites terms are still in use in some areas of Anatolia. Opium Poppy was used by Hittites and named as "hassikka" which is believed to be a source for today's "hashish" in English (2). Another example to greatly advanced civilization in science is the Urartu Kingdom which ruled in East Anatolia in 850-580 BC. A cranium belonging to this period has the first craniotomy with signs of survival. An advanced surgical technique similar to that used today was used (3). Numerous small holes were first made and then linked with a chisel like tool. There are numerous other trephined craniums belonging to these periods in Anatolia.

During the Greco-Roman Period (332 BC – AD 395) very important researches contributed to the development of neuroscience. The systematic studies on the human anatomy starts with the Greek scientist Herophilus of Chalcedon (335-280 BC). Chalcedon is the ancient name of today's Kadıköy of İstanbul, which was a small town by the shores of Bosphorus. Herophilus carried out his main studies in Alexandria, which was considered as the center of science of that era. He performed dissections to under-

stand the human body with special permissions of Ptolemy II. Numerous structures of the nervous system were discovered and named by Herophilus (4, 5). Asclepiades of Bithynia (124-70 BC) was born in today's Bursa of Turkey. He is famous for his way of treating mental disorders by restoring the harmony through occupational therapy, music and exercise (5). Aretaeus of Cappadocia (AD. 81-138, today's Kapadokya) tried to find an anatomical explanation on the curious phenomenon of lateralization. He was the first to describe the aura and hallucinations preceding epilepsy, observing that bad-smell, and noises in the ears, tremors and weird sensations in the hands or feet may occur before the seizure (5). One of the most important medical centers of that era was at Ephesus (Today's Efes) on the western coast of Asia Minor. Rufus of Ephesus (AD. 110 - 180) distinguished the nerves of motion from the nerves of sensation. He defined the course of the optic nerves in detail and described the parts of the eye (5). Another figure from the same period was Soranus of Ephesus (AD. 98-138). His works contain descriptions of epilepsy, vertigo, catalepsy, spasm, and stroke (5). The most important physician of the Greco-Roman period was Galen of Pergamum (AD. 131-201, today's Bergama). In fact he was the greatest medical man of antiquity after Hippocrates. He studied medicine at Smyrna, Corinth, and Alexandria and returned to his hometown as the surgeon of gladiators. He differentiated and named many structures of the nervous system, which are mostly still in use today. One of Galen's important contributions was the classification of the cranial nerves, a classification that was employed until the seventeenth Century (5).

In the Byzantine Period (AD. 395-1453) that lasted for more than a thousand years, some important contributions were made to neuroscience. Oribasius of Constantinople (325-403 AD, today's Istanbul) gave precise descriptions of the result of cuts at different levels of the spinal cord. He also noted the effects of excessive fluid within the ventricles and subdural space (5). Alexander of Tralles (AD. 525-605, Today's Aydın) gave accurate information on headaches, mental disorders, epilepsy and its origin in the brain (5).

The Ottoman Period (1299-1923) in Anatolia has raised a few figures in medicine and science. Şerafettin Sabuncuoğlu (1385-1470) is one of the most famous surgeons in Anatolia. He is the writer of the first medical textbook with colorful illustrations. He has drawn colored miniatures to explain surgical positions and techniques. Sabuncuoğlu explained migraine headaches, epilepsy, hematomas and fluid collections in the head and treatment of these entities as well as the reduction of fracture dislocation of the vertebral column (3). Bedbaht Emir Çelebi (1570-1638) was the physician of the Ottoman Emperor. Despite the opposing powerful Islamic instructors, he supported the anatomical dissections on the dead soldiers in order to fully understand the anatomy of the human body, which he declared crucial in understanding and treating the illnesses.

After the foundation of the Republic of Turkey (1923), the

modernization attempts of the last period of Ottoman Empire were finalized. Modern high schools and universities were built. Many students were sent abroad to be educated in many branches of medicine and science. Upon their return, new departments of neurosurgery, neurology and psychiatry were established in Turkey to practice and teach neuroscience. Hulusi Behçet (1889-1948) was a Turkish scientist born in Istanbul. He discovered a new disease due to immune-mediated small-vessel systemic vasculitis, which was named after him in 1937 as "Behçet's Disease" (6). This disease may have neurological manifestations, namely "Neuro-Behçet's Disease". Doubtlessly the most important figure in the history and present of Turkish Neuroscience is "The man of the Century", M. Gazi Yaşargil (7). He is the pioneer of microneurosurgery. Yaşargil has trained more than 3000 neurosurgeons from all around the world and he is still working actively and teaching new generations in Istanbul.

The history of neuroscience in Anatolia includes great examples of scientists that increase their knowledge by travelling to different centers in the world. This approach in continuing medical education still remains the most crucial factor in neuroscience. I urge new generations to spend at least one year abroad, working in laboratories and observing expert surgeons as well as attending international meetings, courses and congress. With this perspective, in the last couple of decades, Turkish neuroscientists are in a great breakthrough in terms of technical skills and increasing the number of published papers in highly respected journals. Moreover, numerous Turkish neuroscientists working abroad became prominent figures in their departments. INJ will be a new channel for Turkish Neuroscientists to share their experiences and findings with their colleagues in every branch of neuroscience.

INJ differs from other journals with its collective atmosphere and its publishing vision that provokes collaborative multidisciplinary work. This important mission that INJ has undertaken has signs of Professor Samii's great brilliance, which will be fully appreciated after harvesting the fruits of INJ. I urge you to contribute INJ with papers on the new innovative needs and ideas to open new pathways to neuroscientists.

References

1. Burton AC. Variety—the spice of science as well as of life. The disadvantages of specialization. *Annu Rev Physiol*. 1975;37:1-12.
2. Yaniv Z DN. *Medicinal and aromatic plants of the middle-east*. New York: Springer; 2014.
3. Solaroglu I, Acar F, Bavbek M, Ture U, Beskonakli E. The history of neurosurgery in Anatolia and Turkey: the Turkish Neurosurgical Society. *World Neurosurg*. 2013;79(1):16-24.
4. Acar F, Naderi S, Guvencer M, Ture U, Arda MN. Herophilus of Chalcedon: a pioneer in neuroscience. *Neurosurgery*. 2005;56(4):861-7.
5. Mc Henry J. *LC: Garrison's History of Neurology*. USA: Charles C Thomas; 1969.
6. Behcet H, Matteson EL. On relapsing, aphthous ulcers of the mouth, eye and genitalia caused by a virus. 1937. *Clin Exp Rheumatol*. 2010;28(4 Suppl 60):S2-5.
7. Yasargil MG. A legacy of microneurosurgery: memoirs, lessons, and axioms. *Neurosurgery*. 1999;45(5):1025-92.