Langerhans in the Middle East: More about the discoverer of the pancreatic islets

Efraim Lev, Karin Ohry-Kossoy and Avi Ohry

Summary
Paul Langerhans is forever associated with the discovery of the pancreatic islets which bear his name. His numerous other contributions to anatomy, pathology, anthropology, and clinical medicine (particularly leprosy and tuberculosis) are less known. In 1870 he joined the Kieperts, father and son, two noted German geographers, on an expedition to the Middle East. His clinical and anthropological findings from this journey appeared in the journal published by his famous mentor, Rudolf Virchow. Langerhans later fell ill with tuberculosis and spent his last years on the island of Madeira, where he continued to investigate, practise medicine, and write.

Résumé
Le nom de Paul Langerhans est à jamais associé à la découverte des îlots du pancréas qui portent son nom. Ses nombreuses autres contributions dans les champs de l’anatomie, de la pathologie et de la médecine (en particulier, la lèpre et la tuberculose) sont moins bien connues. En 1870, Langerhans participa, avec les Kieperts, père et fils, deux géographes allemands très connus, à une expédition au Proche-Orient. Les résultats des recherches cliniques et anthropologiques entreprises au cours de ce voyage furent publiés dans le journal de son célèbre mentor, Rudolf Virchow. Plus tard, Langerhans développa une tuberculose; les dernières années de sa vie se passèrent dans l’île de Madère, où il continua ses activités de recherche, de pratique clinique et d’écriture.

Life and Work
Paul Langerhans was born in Berlin in 1847. His father was a well known physician and local politician, and two of his brothers were also physicians. He studied medicine first in Jena, then in Berlin. He was fortunate to have several famous teachers such as Langenbeck and Haeckel, but in particular Rudolf Virchow, the founder of modern pathology, and Julius Cohnheim. Both influenced young Langerhans, Virchow also becoming a close personal friend.121

While still an undergraduate student, Langerhans worked in Virchow’s laboratory and made his first major histological discovery. He used the gold chloride staining technique of his teacher Cohnheim to describe new skin cells, their function however remaining unknown to him.230 Since then called Langerhans cells, they were shown only in 1973 to play a role in the immune system. Langerhans published his findings in 1868 in an article in Virchow’s Archiv, in which he also described the stratum granulosum known as the layer of Langerhans.161

He achieved his most famous discovery, the pancreatic islets, also as a student, between 1867 and 1869 during his research for his MD thesis, again without knowing the function of these cells.17 It was E. Laguesse of Lille (France) who first wrote in 1893 that these ‘islets of Langerhans’ could be the source of an internal secretion; because he named them ‘islets’, the hormone they produced would be called insulin 30 years later.

In 1870 Langerhans went to the Middle East on a scientific journey, about which more will be said later. He served as medical officer in the Prussian army during the 1870-1871 war against France. He then became professor of pathology at Freiburg im Breisgau, a promising career which he had to renounce very soon after when he became ill with pulmonary tuberculosis. This was also the reason for his decision to go to the Portuguese island of Madeira, the climate of which was then believed to be good for his condition. He did improve there and started practicing medicine, as well as studying the local marine fauna. Sending his papers to the Berlin Academy of Sciences, he described over 50 new varieties of marine worms. Some of them were named after him, while he called one Virchowa in honour of his mentor and friend. In 1885 he published a guide to Madeira.189 He died there in 1888, aged only 41.191

Langerhans in the Middle East
It was Virchow who suggested to Langerhans that he should join a scientific expedition to the Middle East led by the geographers Heinrich Kiepert and his son Richard (1846-1915). Paul would be the team physician and could conduct his own research in his spare time. The original idea was to attend the Suez Canal opening celebrations before exploring the region, but this did not come about. The team left Germany in March 1870 for Egypt, where they visited Alexandria and Cairo, continuing to Jaffa, from where they headed for Jerusalem, the departure point for their trips in the area. In early April the team undertook a three-week expedition to eastern Jordan. In May Heinrich Kiepert went alone to western Jordan because Richard came down with typhoid fever. Paul remained with Richard in Jerusalem, concentrating on the two subjects which particularly interested him in the Holy Land: anthropological study of the local population, and leprosy. In early June Langerhans and the Kieperts sailed from the port of Jaffa, stopping in Beirut, visiting Damascus, then continuing to Cyprus, Rhodes, and
Istanbul. From there they went to Vienna and returned to Berlin in July 1870.

**Anthropology**

Langerhans conducted his research by systematically measuring the skulls of the natives, mainly Bedouins, in Jerusalem, Jericho, and the East Bank of the river Jordan. He also photographed and sketched them. Thanks to information he obtained from the locals he was able to collect skeletons at various sites. The biggest contribution to his project was made by the Beni Aduan and the Beni Sacher tribes. Apart from the similarity he found between some of the local faces and the pictures of the first Christian saints, he concluded that from an anthropological point of view there were three main groups in the population of the Holy Land:

1. The Bedouin or nomads
2. The fellahin or Arab farmers
3. The town dwellers, including Europeans.

He reported his findings to Virchow, who published them in his *Archiv.*

**Leprosy**

When Langerhans visited the two leper colonies existing in Jerusalem in 1870, the medical world was still in the dark about this ancient scourge of mankind. Three years later (1873) A. Hansen of Norway described *mycobacterium leprae,* but effective long-term treatment only came in 1941 with the introduction of Promin injections. Langerhans wrote to Virchow that the medical standard in Jerusalem was very low, even worse than in Cairo, because religion, instead of science, controlled the situation. There were neither postmortem examinations nor a medical library. Patients with leprosy were not admitted to any of the general hospitals in the city. The first leprosarium he saw consisted of 15 miserable, dirty barracks located near Zion Gate, home to 25 people who subsisted on begging. Their children were raised outside the colony by other family members living in the city.

Since no children had been born to them after the lepers came to live on the site, Langerhans concluded that reproductive ability is lost once the disease is contracted. No treatment, medical or other, was given to these people. There were leper colonies in Nablus, Hebron, and Ramleh to which Langerhans did not go, but he did visit the other one in Jerusalem, established in 1867 by Baron and Baroness Keffenbrinck-Ascheraden from Germany. This couple had toured the Holy Land in 1865 and after having been shown around by Dr. Chaplin, an English physician who investigated the disease, they decided to alleviate the terrible conditions the lepers lived in by building an asylum in Jerusalem. They appointed Chaplin as one of the directors of the institution. It opened under the name *Jesus Hilfe* and Chaplin became its chief physician, a post he held until 1886 when he left Jerusalem. His successor was Dr. Wheeler, who wrote that Chaplin "made a careful and systematic examination of each leper in Jerusalem and Ramleh, and was at that time one of the authorities on leprosy." In 1870 *Jesus Hilfe* had 12 patients and was a better place than the leprosarium at Zion Gate. Chaplin was the physician in charge. The staff consisted of a German missionary, Mr. Tappert, his wife, and another lady. Financial support came from Germany while the patients were Arabs. This brought Langerhans and Chaplin to the conclusion that leprosy does not affect Europeans. At least three of the patients Langerhans examined there were not lepers. One suffered from psoriasis, one from elephantiasis, and one from some form of arthritis. He was curious about the etiology of the disease, wondering if it was inherited, due to contaminated food, etc., but he returned to Berlin without any new answers. Upon his return home his scientific career was put on hold because of the Franco-Prussian War (1870-71), in which he served as medical officer, but immediately after it he was appointed to his first academic post.

The papers that resulted from his short time in the Middle East in 1867 show the range of his interests, his inquiring mind and his ability to make the most of his time.

**Bibliography**

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Biographical notes:
Efraim Lev BA MSc PhD, is a researcher and lecturer at Haifa University, Israel. He was the chairman of the Israeli Society of the History of Medicine (2002-2003). His main research interests include: general history of medicine in the Levant, ancient to medieval materia medica, and ethnopharmacology. Currently he is an Overseas Visitor Scholar at St. John College, Cambridge (2003-2004).
Address: Department of Eretz-Israel Studies, University of Haifa, Israel 31905
Email: efraiml@research.haifa.ac.il
and le225@cam.ac.uk
Almost certainly the very first doctor to dwell, if not actually practise, on Australian soil was a Dutchman, Jeronimus Cornelisz. He arrived on June 4th 1629, in less than auspicious circumstances, having been shipwrecked on the Abrolhos Islands, 70 kms off the coast of Western Australia, due west of Geraldton and about 500 kms north of the state capital Perth.

The Abrolhos had been first charted and titled in 1619. The name itself means 'open your eyes' or 'look out' in Old Dutch,(1) which is just what Cornelisz and his mates on the Batavia did not do. But it is what happened after the shipwreck that gave Cornelisz his infamous place in history.

Jeronimus Cornelisz was an apothecary by training and plied his pills and potions in Haarlem in Holland.(2) For reasons best known to himself, at the age of thirty, he abandoned his profession and joined the Dutch East India Company (or VOC as they knew it) as an undermerchant. This was a rank on the Company's ships, a kind of second mate. For the rest of his life he does not seem to have used his medical skills, until as we shall see, his very last day. In passing, the motto of the VOC was Jesus is good but Trade is better.

Jeronimus joined the new flagship and pride of the VOC, the Batavia, on her maiden voyage. At 600 gross tonnage and 43 metres in length, the ship was among the largest vessels of her time. She was three times the length of any of Columbus's caravels and twice as big as the Bounty. As wooden ships go, she was a considerable craft.(3)

She carried 332 souls, including many women and children, a company of soldiers in case of pirates, and a rich cargo of coins, jewels and ivory contained in 12 chests. Two hundred and ten of the ship's complement were to die before reaching Batavia or Java, as it is now called. In command of the small fleet of three ships, but ensconced on the Batavia, was Francisco Pelsaert. The skipper of the Batavia was Adriaan Jacobsz.

Despite having an engaging personality and refined manners, undermerchant Cornelisz was at heart an evil man and on the journey to the East Indies resolved with others, probably including Captain Jacobsz, to take over the ship and use it as a pirate vessel. However, before the plans could be put into operation, the navigator made such a monumental miscalculation that they found themselves 960 kms off course in a group of uncharted and treacherous reefs off the Australian coast. Inevitably, they went aground on what was then known as Southland, or Terra Australis Incognita, specifically on the Mornington Reef.

That was June 4th 1629. Forty people were drowned, struggling to try to reach shore. They bypassed the low-lying, so called Traitor's Island, and reached an elevated piece of land, which they promptly called Batavia's Graveyard. It is now called Beacon Island.

On June 6th Pelsaert, having found no water on the adjacent low reef islands and not able to land on the precipitous coast of the mainland, elected to sail for help. In doing so he made an unbelievably cavalier decision, he omitted the tiresome chore of briefly returning to the wreck site and telling his plans to those left behind. During the eventual enquiry, his insouciance was never questioned.

Pelsaert, using the only intact long boat, set off for Batavia Island in what is now Indonesia. With him went all the senior officers, including Jacobsz, all the Company...