History of Neurology

JAMES WENCESLAS PAPEZ, MD

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NEUROLOGY RESIDENT MORNING REPORT
James Papez, MD
1883-1958

• B: Glencoe, Minnesota (Moravian Czech Settlement)
• MD – U. Minnesota, then Fellowship studying comparative neuroanatomy
• Taught Anatomy in Atlanta-Emory (1911-1920)
• Prof of Anatomy – Cornell Univ, Ithaca, NY (1920-1951)
• Looked ceaselessly at serial sections of brain; looked for fiber connections
  • “After evening dinner his indulgent wife, Pearl, and their three children, would excuse him so that he could go back to the laboratory and view some more sections.” Haymaker. *Founders of Neurology*, 1946; P. 143
• Course on Comparative Neuroanatomy became famous
  • Book: *Comparative Neurology*, 1929
    • Illustrated by his wife, Pearl
James Papez, MD
1883-1958

Papez. *Comparative Neurology*. 1929
Papez Circuit

• A Proposed Mechanism for Emotion. Arch Neurol Psych. 1937;38:725-743

• Hippocampo-mamillo-thalamo-cingulate-hippocampal circuit

• Papez: “The central emotive process of cortical origin, may be conceived of as being built up in the hippocampal formation and as being transferred to the mammillary body and thence through the anterior thalamic nuclei to the cortex of the gyrus cingula...Radiation of the emotive process from the gyrus cingula to other regions in the cerebral cortex would add emotional coloring to psychic processes occurring elsewhere...It is evident that [the proposed mechanism of emotion] will have to stand the test of experimental and clinical experience if it is to be useful in science.”
Papez Circuit

Figure 20-4. Limbic connections. Major afferent and efferent connections of the hippocampal formation. The circuit of Papez is: hippocampal formation → mamillary nucleus → anterior thalamic nucleus → cingulate gyrus → hippocampal formation. The hippocampal formation consists of three components: the hippocampus proper (cornu ammonis), the subiculum, and the dentate gyrus. The hippocampus projects to the septal area; the subiculum projects to the mamillary nuclei; and the dentate gyrus does not project beyond the hippocampal formation.

Figure 18-2
The Papez circuit as originally proposed (black lines) and with the later observed connections (shaded). In Papez’s original work, the hippocampal formation was viewed as a single area.
Papez Circuit

Figure 18-17. Drawing of the most surface of the hemisphere. Shading indicates the limbic lobe which includes the upper brain stem. Although the cortical areas designated as the limbic lobe have some common structural characteristics, the extent to which they form a functional unit is not clear.

Carpenter & Sutin. Human Neuroanatomy. 8 ed. 1983

Figure 50-5 A neural circuit for emotion proposed by James Papez and extended by Paul MacLean. The circuit originally proposed by Papez is indicated by thick lines; more recently described connections are shown by fine lines. Known projections of the fornix to hypothalamic regions (mammillary bodies and other hypothalamic areas) and of the hypothalamus to the prefrontal cortex are indicated. A pathway interconnecting the amygdala to limbic structures is shown. Finally, reciprocal connections between the hippocampal formation and the association cortex are indicated. The hippocampal formation includes the hippocampus proper and surrounding structures, including entorhinal cortex and the subicular complex.

James Papez MD & the Papez Circuit

He established the concept that the limbic lobe – the hippocampal gyrus, uncus, isthmus, gyrus cingula, and the related areas. He observed that these structures, through their connections with the hypothalamus and the thalamus, play an important part in the central regulation of the autonomic nervous system and of visceral and sexual functions, as well as in the autonomic factors involved in emotional expression, but his observations long went unrecognized.

James Papez MD & the Papez Circuit

At the time, obscurity prevailed as to the significance of the human hippocampus: it might have an olfactory liaison and might be involved in epilepsy and in hydrophobia. Papez was convinced that the basis of emotion is phylogenetically evolved through the medium of the gustation and the olfaction mechanisms concerned in nutrition and reproduction, and he thought that the taste of potential food and the odors associated with rutting form the guides for feeding and mating drives.

James Papez, MD
1883-1958

• Wrote poetry – especially in morning before breakfast
• 1957 – *Fragments of verse*
• “Mr. Chipps like character Gentle, unassuming, loved by students, clothes never seemed to fit well” Haymaker, *Founders of Neurology* 1946
• “Being totally devoid of vanity or guile his only reaction to stupidity or avarice [in others] was a momentary, surprised unhappiness with shortcomings that had no corollary in his own makeup...” Fred A. Mettler, Papez’s Assistant.
• Retired from Cornell 1951
• Then Columbus, OH Director of Biological Research at the State Hospital
• “One Sunday morning, while finishing breakfast with his wife, he felt ill (precordial distress) and remarked calmly: ‘This is it.’ He went to the couch, brushed away the newspaper, lay down, and was soon gone.” Haymaker, *Founders of Neurology* 1946
James Papez, MD
1883-1958

The mammillothalamic tract is also referred to as the mammillothalamic tract of:

A. Papez  
B. Cannon  
C. James  
D. Vicq-d'Azyr

Answer:  
Felix Vicq-d’Azyr
Felix Vicq-d'Azyr MD
(1748 -1794)

- French physician & anatomist
- the originator of comparative anatomy
- last physician of Queen Marie-Antoinette
- Mamillothalamic tract also called “bundle” of Vicq-d’Azyr
- First to use coronal sections of the brain
  - used alcohol to aid dissection
- Also described
  - locus niger (substantia nigra)
  - locus coeruleus
  - Band of Vicq-d’Azyr
    - between the external granular layer and the external pyramidal layer of the cerebral cortex