

The organism as a fluid continuum

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Elsa B. Cohen (1941–2005) graduated from Columbia College of Physicians and Surgeons in 1966 and became a gifted and revered teacher of pathology at the Medical College of Wisconsin for over 25 years. She carried out research in anatomy and pathology. In 1984 she published a theoretical article in which she proposed the novel idea of treating weak chemical forces as determinants of biological structure (J. theoret. Biol. **108**, 369–376). Unfortunately her paper is little known although at least one citation acknowledges its “unconventional and provocative” nature in the context of paradigm change. In fact Cohen’s article offers a remarkable insight into living organisms and, using it as a fulcrum, this talk explores the consequences of her concept for the disciplines of anatomy and physiology.

Cohen developed her ideas (manuscript unpublished) and in correspondence in 1985–86 introduced the notion of the ‘chemical structural entity’ or *chemistren* (acronym). The *chemistren* will be considered in the context of wholistic aspects of the organism, including cooperative phenomena (synergisms), cellular sociology, bound water, and the problem of thermodynamic phases and living matter.

Cohen’s *chemistren* takes us away from hierarchical reductionism into a realm of *non-molecular* biology: one upshot is that we need to reconsider the definition of the boundary of an organism. This requires a re-evaluation of the topology of living forms at all levels – macroscopic, microscopic, and ultrastructural. In turn this necessitates consideration of the devastating actions used to process living tissues for high-resolution morphological studies and the interpretations of structure based on transmission electron microscopy.