

Abstract: B. Freeman lecture, OSD Symposium, Berlin. Sat. 06.12.2014, 11:30–12:00

### **The organism as a fluid continuum**

Brian Freeman, School of Medical Sciences, University of New South Wales, Sydney

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Cohen developed her ideas (manuscript unpublished) and in correspondence in 1985–86 introduced the notion of the ‘chemical structural entity’ or *chemistren* (acronym).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.

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**[Der Organismus als Fluid-Kontinuum]**

NOTES [not for publication]

30 min LECTURE: ‘The organism as a fluid continuum’

[supporting material: 30 min pptx- 12 slides]

Hydrogen bond - Chemistrens – giant molecule – spatial variations in viscosity – sol/gel transitions - lack of sharp boundaries &

Only 5 citations of EB Cohen (1984) – all copied or ILL 25 May 2014

<http://www.cumc.columbia.edu/psjournal/archive/spring-2006/memorial.html>

Elsa B. Cohen - Class of 1966

ELSA B. COHEN, a retired academic pathologist, died of leukemia Dec. 5, 2005. After training at the famous First (Columbia) Medical Division at Bellevue Hospital and Einstein Medical College, she moved to Milwaukee, where she taught on the faculty of the Medical College of Wisconsin and worked on staff at Milwaukee County General Hospital. She is survived by her husband, Roger D. Cohen '63, a son, and two grandchildren.

<http://www.mcw.edu/medicalschooleducationalservices/FacultyDevelopmentandResources/MCWSocietyofTeachingScholars/ElsaCohenFund.htm>

Established in honor of Dr. Elsa B. Cohen, an extraordinary teacher, educator and leader at the Medical College of Wisconsin for over 25 years, this fund supports programs to advance the knowledge, skills and passions of physician educators. Each year, a visiting professor who epitomizes Elsa's passion, curiosity, rigor and commitment to understanding the teaching and learning process will be invited for a day long-symposium for MCW/CHW teachers supported by the fund. MCW's Society of Teaching Scholars and the CHW Foundation under the guidance of the advisory board will coordinate the symposium. Dr. Cohen was in the first cohort of elected society members, installed in 1991.

Contributions to the Elsa B. Cohen, MD, MBA Fund for Medical Education  
may be made through:

Children's Hospital and Health System Foundation  
PO Box 1997

Milwaukee, WI 53201-1997

[www.chw.org/donate](http://www.chw.org/donate)

May 2014: Gilbert Ling; Guggenheim re phase ; phase of living substance; Pollack & structured water; membrane potentials

The false view of TEM

CLEGG: HVTEM & microtrabecular lattice

Bacteria, fluids etc. in the lumen of the intestine are part of us – a super body so bacteria are consensual and integral to human personality.

Albrecht-Buehler (1990's) “in defense of non-molecular biology” Simple idea “super organism”

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Chandebois - Cellular sociology //

Harold Hillman & artefacts // false view of electron microscopy

BIOME = ECOSYSTEM

The **human microbiome** (or **human microbiota**) is the aggregate of [microorganisms](#), a [microbiome](#) that resides on the surface and in deep layers of skin, in the saliva and oral mucosa, in the [conjunctiva](#), and in the gastrointestinal tracts

Roger Cohen MD

Dr. Roger D. Cohen, MD

Specializes in Pediatric Surgery • Male • Age 77

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*Dictyostelium discoideum* belongs to the group dictyostelids. It is a remarkable protist that can alternate long periods of life as single cells with stages of participation in multicellular assemblies. These assemblies display striking similarities with multicellular organisms including co-ordinated cell movements, differential cell adhesion, cell type specialization and organization into tissues. *Dictyostelium* is a popular system to study the evolution of social behaviour and of developmental strategies.