

Zeitschrift: Archives des sciences et compte rendu des séances de la Société
Herausgeber: Société de Physique et d'Histoire Naturelle de Genève
Band: 42 (1989)
Heft: 1: Archives des Sciences

Artikel: Polarity : from dipoles to bipolarizations. IV. Addenda
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Nachwort: Epilogue
DOI: <https://doi.org/10.5169/seals-740083>

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EPILOGUE

Polarity has been considered as “the directional arrow of Evolution” leading from the primordial, *intrinsic* electro-bipolarity born in the abiotic phase and amplified in the prebiotic phase through the electro-structural polarity of macromolecules, to the induced, newly called *extrinsic* biopolarizations achieved in the biotic phase (see Addenda III).

In this evolutionary view of Polarity, the advent of progressively complexified developmental polarities, capable of overstepping elementary self-assembly processes, has been achieved by the *take-over* of a positional genetic information increasingly competent in its gradiential expression of morphogenetic molecules. However, in this genetic take-over, the intrinsic electrical bipolarity could be conserved through its fruitful exploitation of the unique dipolar and vectorial electrostatic proprieties of hydrogen bonding, prototyped in the H₂O network, developed in the first biomolecules and the intra- or inter-molecular H bonds of α-helical - β-sheet proteins respectively, and finally amplified in the informational base sequence of DNA coding for the most complex polar bioaxiations. Endowed with both electro-structural and informational polarity contents, the H bonding can thus be considered as the unifying principle of continuity in the evolutive complexification of Polarity from its intrinsic, physico-chemical fundamentals to its extrinsic, genetically-controlled but epigenetically, environmentally-modulated polar bioaxiations as sequentially summarized in the following synopsis:

SCALE OF POLARITY COMPLEXITY

- 1) electrical (-magnetic) bipolarity:
 - a) subatomic asymmetries (+/- electric charges, N/S magnetic poles),
 - b) atomic (H), molecular inorganic (H₂O, etc.) and organic (amino acids, etc.) dipoles, and H electrostatic bonds;
- 2) electrical-structural bipolarity:
 - a) informational (nucleic acids),
 - b) translational macromolecules (polypeptides - proteins, etc.);
- 3) structural bipolarity:
 - a) cytoskeleton (actin, myosin, tubulins),
 - b) viral self-assemblies.

- 4) physical-chemostructural polarizations:
 - a) physical effectors (light-induced charge separation, etc.);
 - b) chemostructural effectors (crystals → light polarization, semi-superconductors → electric fields).
- 5) electrical-structural pericellular bipolarizations:
 - a) transversal (“perpendicular”) through plasma and organellar membrane (a¹) conformations, (a²) energy transduction and (a³) electric potentials;
 - b) tangential (“planar”) along (b¹) apical-basolateral, epithelial and (b²) longitudinal, axonal membranes (action potentials);
- 6) structural-functional intracellular bipolarizations:
 - a) monopolar (a¹) molecular intermembranar targetings, (a²) vesicular traffics and (a³) energetic motors;
 - b) bipolar (b¹) homo-symmetric mitoses, (b²) hetero-asymmetric cell divisions;
- 7) genetical-developmental bipolarities:
 - a) apical (a¹) monopolar and (a²) bipolar growth patterns;
 - b) axial (b¹) anterior-posterior, (b²) dorsal-ventral, (b³) bilateral (chiral) differentiation patterns;
- 8) environmental polar movements:
 - a) cellular tactisms (chemo-, photo-, etc.)
 - b) organismic tropisms (chemo-, photo-, gravi-, galvano-, polaro-).

From now on, we expect to use this first integrating frame to further select “New Trends in Polarity” from the ground-line of the encyclopedic information assembled since 1989 in our Survey and its Addenda.

We are indebted to the Committee of the “Société de Physique et d’Histoire Naturelle” for continuous financial support, to Faculty colleagues for stimulating discussions, and to Ariane Fehr for expertise in manuscript preparation.