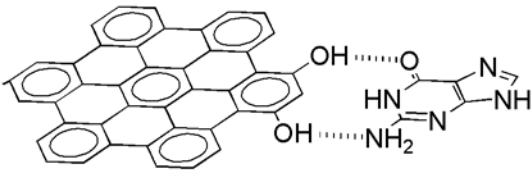


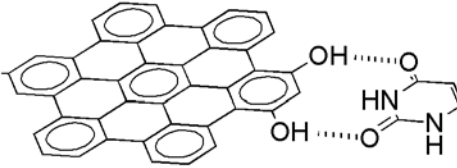
The 'PAH World': Discotic polynuclear aromatic compounds as mesophase scaffolding at the origin of life.

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'PAH World' is a novel chemical structural model for the formation of prebiotic proto-informational oligomeric materials, presumably 'upstream' of something resembling the widely regarded RNA World. The model is based on the self-assembling discotic-mesogenic behaviors of polynuclear aromatic compounds, their photochemical edge-derivatizations (*e.g.*, -OH, =O), and the selectivity of such stacked supramolecular scaffolds for the edge-on binding and *ca.*0.34nm plane-parallel spacing of random collections of small prebiotic heterocycles, taken-up and concentrated from the presumed 'dilute prebiotic soup'. The constrained separation distance could further select for oligomerizing 'linkers' of fairly restricted size (*e.g.*, (HCHO)_n), which would condense with the small heterocycles and also with each other to form the flexible structural backbone of a first generation of proto-informational oligomeric material, stabilized against both hydrolytic and photolytic degradations by its association with the discotic aromatic mesophase. A local pH decrease (*e.g.*, volcanic SO_{2(aq.)}) would disrupt the hydrogen bonds anchoring the oligomer to the scaffold, thereby releasing segments or portions of oligomeric material to explore intramolecular degrees of motional freedom, perhaps folding back on themselves to match up adventitious Watson-Crick-like base-residue pairings. Segments rich in such chance complementarities would likely persist by virtue of the combined co-operative strengths deriving from multiple non-covalent intramolecular interactions: hydrogen bonds (base-paired heterocycles), and van der Waals forces (including π - π stacking interactions). Base mismatches would naturally lead to point replacements towards minimizing conformational potential energies, in which stacked planar base-pairs would effectively constitute the essentially hydrophobic 'aromatic cores' of quasi-discotic mesophases in the secondary and tertiary structures of these proto-informational oligomeric materials.



$(\text{HCHO})_n$



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