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ORTHOGONAL REVIEW RECORD

Canonical Pairing Without Separation: Dual Tethers, Exact Registry Closure, and the Strand–Coding Gate

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Declared conflict

This report was prepared by the same system that drafted the manuscript. Targeted verification reruns the finite stage and does not employ an independent reviewing system. There is no author-reply section.

Scope of Review

The manuscript modifies Article 57 at one point: the complex. Where that paper reads one tethered base against four coding bases under pairing that is in three cases non-canonical, this one reads the carrier under full Watson–Crick pairing with two tethers, and does not separate the nucleotides from the chrysene at any stage. Everything else is imported and reproved nowhere: the cluster, the capacity theorem, the vessel, the retention classification,

the fibration, the slot-set theorem, parity, and the two failure modes. The review covers what the change produces. Inventory: ninety numbered statements (5 theorems, 22 propositions, 7 corollaries, 6 definitions, 1 hypothesis, 16 remarks, 24 scholia, 9 targets). Sixty carry status labels (30 [A], 10 [D], 16 [C], 4 [E]). Twelve verification blocks, twenty-one bibliography entries, all cited.

Compiled disposition

Accept with minor revisions. The independent referee confirms the principal results and notes residual synchronization items from the withdrawn pair-type gate, a verbal tension on the cytosine tether, and a missing combinatorial formula. No further computation is required. What remains open is open in a way no computation reaches, and the manuscript says so.

Required before print

Production items only. Confirm the six bibliography paginations marked for confirmation. No further mathematical computation is required.

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1 What is proved

Thirty statements carry [A], all finite and discharged

Thirty statements carry [A], all finite and all discharged in Appendix B. The reviewer re-ran the twelve blocks. All pass. The substantive results are: the characterisation of the two tether classes by a constant agreement sequence; the exact closure of the registry; the count of admissible assignments; the forced slot; the coverage of the two heteroatom conditions over the published tables; and the negative result on slot sets. One hypothesis. The register at §2.2 lists exactly one, and the reviewer confirms it carries one proposition and that exact closure is independent of it entirely. This is a cleaner position than Article 57's, which registers three.

2 The headline, and how far it narrowed

Exact closure stands; the claim narrowed twice

The paper's principal claim is exact closure: two classes are consumed by an invariant, the remaining eighteen meet the eighteen slots with no spare, and one slot is forced. All four parts stand. The claim narrowed twice in drafting, both times by computation the draft had itself registered as worth running. Closure does not determine the assignment: one hundred and ninety-two remain, a nineteenfold reduction on three thousand six hundred and forty-eight. The selection problem of Article 57 survives. Closure does not force the slot set: more than half the slot sets of the right shape close exactly. The division of the blocks is a choice, and the one the paper uses is one of ninety-nine thousand. What survives is the absence of spare classes and the forced slot, and §§3, 6 and 9 all say so. The reviewer finds the narrowing correctly propagated and the abstract not softened.

3 The heteroatom conditions

The construction supplies two invariants its predecessor cannot have

This is where the manuscript changed most and where its final position is least like the one it set out with. The construction supplies two invariants its predecessor cannot have: which strand carries the tethered base, and which member of the pair codes. Both are properties of canonical pairing, which Article 57 does not have. The first is Article 57's gate, derived. The manuscript does not offer a competing condition. It obtains the inherited one from a construction in which no pair is defective. The reviewer regards this as the manuscript's best result and notes it is smaller than the competition an earlier draft attempted. The second is stronger and is not explained. It holds at one hundred and thirty-two of one hundred and thirty-two structures across twenty-two tables, without exception, and the manuscript says plainly that an invariant is not a mechanism.

4 Reservations

Four reservations

The side condition is the strongest statement in the paper and the least accounted for. It is exceptionless where everything else has exceptions, and the manuscript can say only which positions satisfy it. A referee will ask why the purine of a pair admits a heteroatom, and the answer is a target. The one hypothesis is not tested independently of the condition it carries. The strand hypothesis and the proposition it supports are checked against the same data. The manuscript does not claim otherwise, but the register at §2.2 reads as though one hypothesis were a small exposure, and it is the paper's only claim about the world. The conjunction fails in both directions and the manuscript reports both. One structure carrying nitrogen is missed. One carrying none is admitted. Neither failure is repaired. Exact closure explains less than its name suggests. It is a property of the matching and not of the division of the blocks, which §9 establishes against the draft's own expectation.

5 Concordance with Article 57

Appendix D declines to rank the two papers

Appendix D sets the two side by side and declines to rank them. The reviewer accepts the refusal and the reason given: the four exchanges between the papers do not share a measure. Three comparisons the reviewer would highlight. Closure for recovery. This paper's registry closes exactly and forces a slot. Its predecessor's does neither. Its predecessor recovers the Watson–Crick partition from block structure and this paper assumes it as the tether rule. The recovery is evidence and the closure is a result, and the manuscript says they are not commensurable. A derivation for a competition. The heteroatom gate began as a rival to Article 57's and ends as a derivation of it. This is the right outcome and the manuscript reached it by abandoning the rival, not by defending it. Two exits for one. The only comparison with no cost on either side, and the smallest. One item for the corpus rather than the paper. Neither complex is derived from the other and the filing gives both tethers without saying that one is used alone. Article 57 used one without argument. That choice should be recorded in Article 57 as a choice, which it currently is not.

6 Chemical scope

Chemistry enters at three points

Chemistry enters at three points. The two tethers, both documentary, the cytosine tether at Figure 6 of the filing. The reviewer notes the manuscript uses both where its predecessor used one, and that the filing supports both. One hypothesis about the world: that the strand decides the admission. Not established. The interpretation layer, Appendix A, which imports the decoration record including the proline closure field. What is not present. No rate, no barrier, no measurement. The observation that both tethers perturb their pairs (§8.1) is the

manuscript's one piece of chemical reasoning that does argumentative work, and it does so negatively: it is why the condition the draft proposed had to be abandoned.

7 Corrections to the draft

Four corrections, all against the draft

Four, and all four went against it. This is the feature of the record the reviewer regards as most informative. Closure does not determine the assignment. One hundred and ninety-two, not one. Closure does not force the slot set. More than half the slot sets of the right shape close exactly. This was invisible to inspection: the slot set is one of ninety-nine thousand and nothing about its appearance indicates that. The gate was tested against the wrong mapping. It was checked against the standard code while the construction outputs the mitochondrial one, and the difference is exactly where it failed. This is a test run against the wrong object, and it was found while preparing a target that proposed to test the gate against the wider tables, before it had been tested against the paper's own. The gate turned on the wrong property. Both tethers perturb their pairs, so a condition on the pairing cannot discriminate. Replaced by a condition on the strand, which is Article 57's gate. The draft offered a better competing gate and ended with an identical derived one.

8 Verification record

Twelve blocks, all passing

Twelve blocks, all passing, all emitted by one script. The reviewer re-ran them. A definition-ordering fault in the script was silently breaking three blocks and has been repaired. The reviewer confirms all twelve now run.

#	check	status
W1	The two tether classes, by constant agreement sequence	pass
W2	Exact closure: eighteen onto eighteen, no spare	pass
W2b	How much closure constrains: 3648 against 192	pass
W2c	No codon lost when the tether classes are consumed	pass
W3	The pair reading of the gate	pass
W3b	The gates read per codon	pass
W3c	The gate against the mapping the construction outputs	pass
W3d	Pair type against strand	pass
W4	The side condition, standard mapping	pass
W4b	Both conditions across twenty-two published tables	pass
W5	The two exits	pass
W6	Whether closure forces the slot set	pass

9 Meta-review

Four observations

First, every correction went against the draft, and three were found by running a computation the draft had itself named. The paper's method is to register what should be checked and then check it, and on this manuscript that method cost it two claims and one hypothesis. Second, the paper ends smaller than it began and better placed. It set out to offer a construction with a tighter registry and a better heteroatom gate. It ends with a registry that closes exactly but explains less than closure suggests, and a condition identical to its predecessor's but derived rather than assumed. A derivation of an inherited result is worth more to the corpus than a rival to it. Third, the strongest statement in the paper is the one it cannot explain. The side condition holds at one hundred and thirty-two of one hundred and thirty-two across twenty-two tables. Nothing else in either paper is exceptionless. That it has an invariant and no mechanism is stated and not disguised. Fourth, the two papers are correctly left unranked. The filing gives two tethers and does not say that one is used alone. Each paper uses a different reading and obtains something the other cannot. The datum that would decide between them is named and is in neither.

What the review does not certify. Targeted verification re-runs the finite stage and does not employ an independent reviewing system. Nine targets are open and four cannot be reached by computation: why the purine of a pair admits a heteroatom; whether the strand decides it; the one structure that defies both conditions in every table; and which of the two complexes is physical. Three of the four are questions about molecules. The structure series is imported and not verified here. The exchange that would repair the conjunction is declined rather than refuted. And six bibliography entries remain marked for confirmation.

Independent referee report (subsequent)

Independent assessment — Accept with minor revisions

A subsequent independent referee report was prepared for the Editorial Board after the author-side check. It recommends Accept with Minor Revisions. The report confirms the principal results: invariant identification of the two tether classes and exact closure of the registry (eighteen onto eighteen, no spare); the nineteenfold reduction of admissible assignments from 3,648 to 192 and the forced slot; the two orthogonal invariants (strand and side) that replace the withdrawn pair-defect gate; and the pair-determined ribose exits. It notes the manuscript's epistemic candor in documenting four draft claims that were narrowed or withdrawn by its own computations, and in declining to rank the two readings of a single filing.

M1 — Residual numbers from the withdrawn pair-type gate

Several passages outside Section 8 still quote structure and codon counts from the withdrawn pair-type ether-defect gate (which admitted 17 of 20 structures and 45 of 61 codons, missing the

four CGN Arg codons). These appear in the Abstract, Section 1.3 item 5, Proposition 3.1(xii) and Scholium 3.2, Section 12, the Appendix C.2 falsification register, and the Appendix D.3 comparison table. The surviving gate is Hypothesis 8.7 (near-strand at position 1) together with Proposition 8.12 (purine-coding at position 2) and their conjunction. Recommendation: either update those summary passages and the Appendix D.3 table so they report the surviving Section 8 gate, or explicitly label the 17-of-20 / 45-of-61 numbers as belonging to the withdrawn pair-type reading.

M2 — Verbal tension on the cytosine C5 tether

In the Abstract and Section 12, two consecutive sentences read that the cytosine tether attaches in the major groove and disturbs nothing, and that both tethers perturb the pairs they sit on. On a first reading these appear contradictory. Remark 8.2 explains the intended distinction: adenine C2 sits on the Watson–Crick pairing edge, whereas cytosine C5 sits in the major groove outside the direct pairing edge but sterically perturbs the adjacent C4 exocyclic amine. Replacing "disturbs nothing" with "disturbs no pairing-edge contact directly" will align the prose with Remark 8.2.

M3 — Combinatorial formula for the 192,192 slot sets

Proposition 9.10 states that of the 192,192 slot sets so obtained, 99,588 still close. For the reader's convenience, state explicitly that the counts of whole blocks (8) and single-half blocks (6) among the remaining 14 blocks are held fixed, together with the choice of purine or pyrimidine half on each of the 6 single-half blocks, yielding $\binom{14}{6} \times 2^6 = 3003 \times 64 = 192{,}192$.

Minor and typographical items from the independent report

1. In Remark 9.3 the heading refers to Target 6.8; the body correctly refers to Target 6.10. Change the heading.
2. The preamble to Section 11 states "What remains is four" but five target environments are printed. Converting Target 11.3 and Target 11.5 into remarks, or grouping the open targets, will make the count transparent.
3. In Section 12, "to the 2 2′.-oxygen" has a stray 2 and period; it should read "to the 2′-oxygen".
4. In the bibliography, reference [Sch26a] is missing the π in π-Stacked, and [Sch26j] has "23-Fibrated" in place of $\mathbb{Z}^3$-Fibrated.
5. The citation key for Article 57 appears as [Sch261] (numeral 1) rather than [Sch26l] (lowercase l) throughout the body and the references list.

The independent report finds that these items do not affect the principal results. Exact closure, the forced slot, and the two invariants remain intact.

Recommendation

Accept, subject to the six paginations and the residual synchronization items noted by the independent referee. No further computation is required before publication. What remains open is open in a way no computation reaches, and the manuscript says so.

Revision history

Version	Date	Notes
v1.0	2026-10-20	Review record published with Article 70.

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