EEF1A2 D91N: what the second seed changed

Filippo D. Galbo - Public research brief, v1.1.0, 2026-11-12 UTC

Results summary

Six retained Boltz-2 models compare WT, D91N and D252H at seeds 11 and 23, one sample per condition and seed. All three planned seed 23 jobs succeeded. The release contains six original coordinate models and 24 native confidence artifacts.

D91N is a mixed result. Its Cα20-Cα91 distance is longer than matched WT in both seeds (+0.756/+0.278 Å). Its O91-EEF1B2 N224 distance changes direction (+1.208/−0.401 Å). The original combined structural-shift interpretation is not consistently reproduced.

Model	Cα20-Cα91 (Å)	O91-N224 (Å)	Interface atom pairs ≤4 Å
WT11	6.723	2.661	461
WT23	6.644	2.900	451
D91N11	7.479	3.869	365
D91N23	6.922	2.498	452
D252H11	6.428	2.696	454
D252H23	6.454	2.997	374

Discussion

The second seed matters: D91N's within-condition changes exceed its matched seed 23 contrasts. Selecting only the agreeing distance would overstate the evidence. D252H's two contrasts retain their signs, but its interface-distance contrasts are small compared with its own seed change. It is an uncalibrated comparator, not proof that the predictor detects impaired biological association.

Two seeds are computational sensitivity checks, not biological replicates. Coordinate distances and confidence do not measure binding, exchange rate, stability or pathogenicity. A null or inconsistent structural result cannot exclude functional effects.

Methods

Each model contains full-length human EEF1A2 and EEF1B2, one GDP and one Mg. Boltz 2.2.1 settings were held at three recycles, 200 sampling steps, one diffusion sample, potentials enabled, custom kernels disabled; no affinity head, explicit template or imposed interface/pocket constraint was requested. Frozen alignment comparability and its limits are documented in the full report. The two primary distances were declared before seed 23. All six models are retained.

Detailed evidence

The full report, exact models, confidence files, numerical tables, molecular inputs, sources, subject map and checksums accompany this brief. The earlier seed 11 release is preserved as history. The public package excludes the private workbench and operational records.

A proposed follow-up asks whether D91N alters eEF1B2-stimulated nucleotide exchange after accounting for soluble, competent eEF1A2 abundance. This experiment has not been performed. No molecular dynamics result is included.

Filippo D. Galbo is the sole human author; substantive AI assistance is documented. Working report/dataset, not peer reviewed or a clinical assessment. Source publications and tools are cited in the accompanying report and ledger.

https://www.filippogalbo.com/research/eef1a2-d91n .