

Table S1. Chronology of first appearance of RNA substructures in ancient RNA molecules. Substructures appearing in separate time events are separated by comas.

RNA	Substructures: Ancient > Recent
tRNA	Acc, T Ψ C, AC, DHU, Var
5S rRNA helices	S1, S3, S2, S5, S4
RNase P RNA	P12, P1, P3, P4, P2, P10-11, P9, P8, P7, P5, P15, P6, P16, P17, P13-P19, P14-P18-P16.1, P16-17, P16.2, P15-16, P20, P5.1, P15.1-P10.1
rRNA	H44, H76-H41-42-H38, h11, H67, h34, H96-h7, H60, H101-H55-H27-h39, h23-H16-H25, h26, h24, h28, H94-H62, H73-H75-H90-H74-H89, h6-h30-h41, h22-h9-h3, H57-h17-h8, H39-H4-H65, H7-H2-H63, H32-H45-H46a-h45-H33, H88-H91, H37-h27-h4, H83-h43, H61, H13-H50, H34-H86-H54, H28-H20-H26-H19-H46-H11, H84-h15-h12-H30-h42, H97-h19-H93-h5-H56, H35a-h25-H95, h20-H44-h18-h40-h32-H43-h13-H1, H15-h33-H68-H10-H70-H71-H52-h16, H58-H79-H69-H81-H31-H47, h29-H72-H36, H49-H53-h1-H80-H17, H9-h36-h31-H92-H99-h41a-h10, H64-h2-H100, H66-H59a-H47a-h35, h18b-H3-h14, H22, H6, H5-h38-h6a-H87-h18a-h37, H18-H14-H8, H39a, H51, H49a, H52a, H29, H48-H82a-H85-H35, H21-H12-H82, H59, h26a-h23a

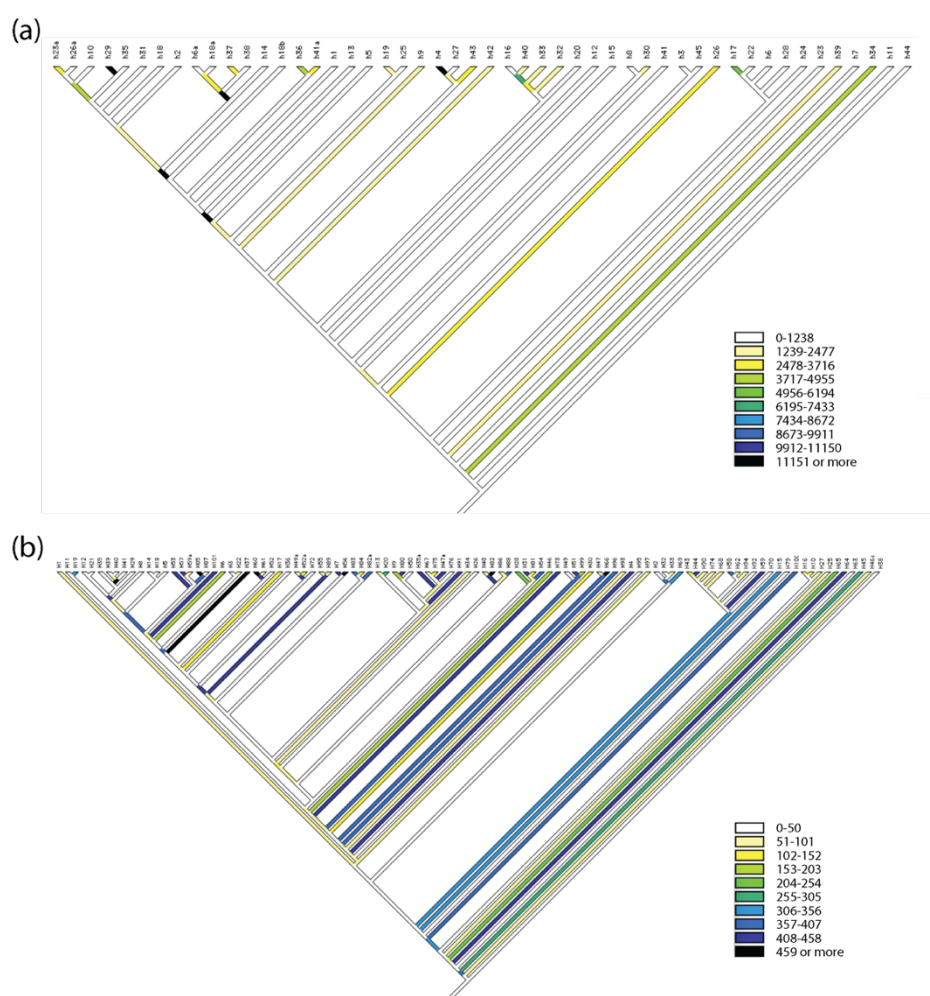


Figure S1. Tracing all possible character state changes on trees of rRNA stems of the small (A) and large (B) subunits of the ribosome reveal character state changes are heterogeneously spread throughout the trees.

Citation: Sun, F.; Caetano-Anollés, G. Menzerath-Altmann's language law of syntax in RNA accretion history. *Life* **2021**, *11*, 489. <https://doi.org/10.3390/life11060489>

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