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## SUPPLEMENTARY MATERIAL

### Solvent effects on the conformational space of Tryptamine. Structural and Electronic Analysis

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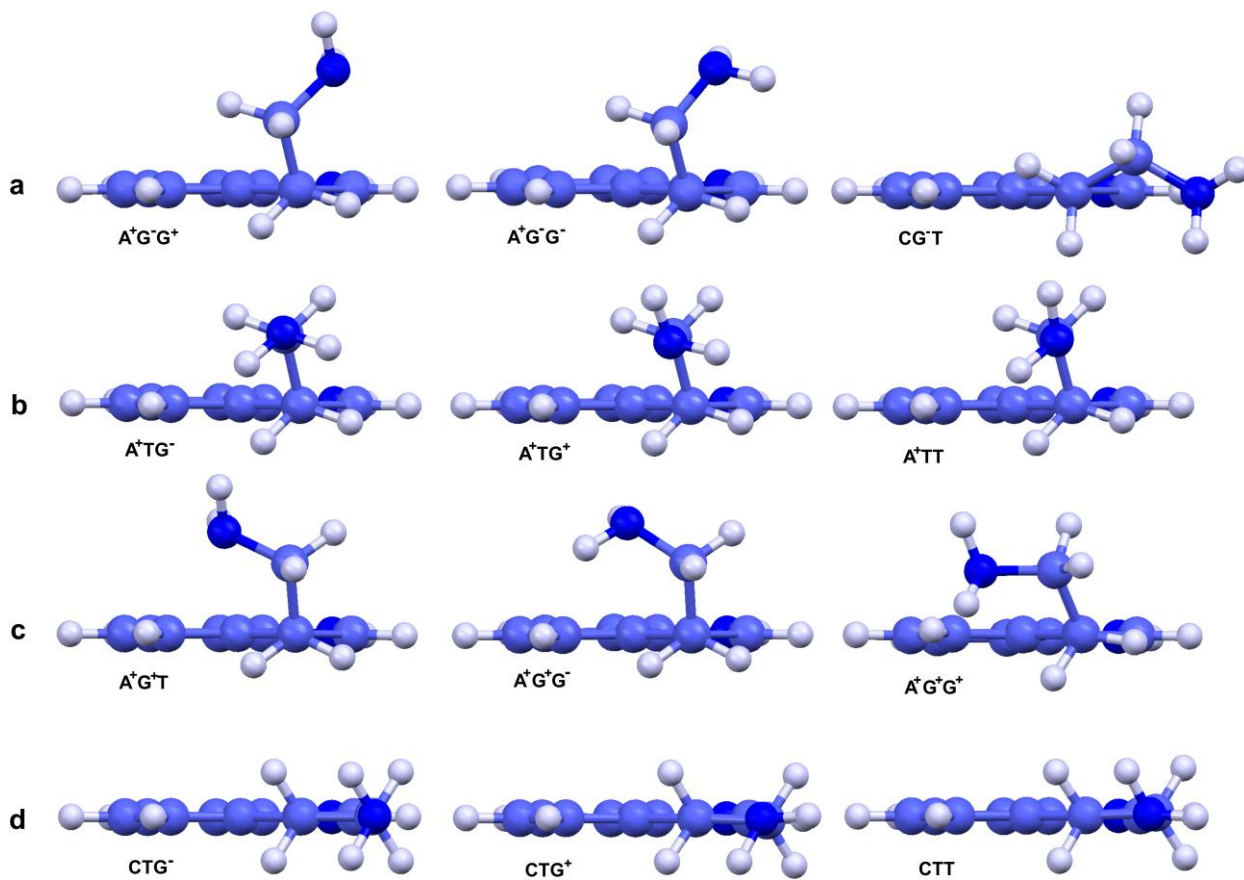
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**Figure S1.** Twelve most stable conformers of TRA. According to IUPAC recommendations the first letter characterizes the orientation of the C<sub>9</sub> atom relative to the central C<sub>3</sub>—C<sub>8</sub> bond, the second letter describes the C<sub>3</sub>—C<sub>8</sub>—C<sub>9</sub>—N<sub>10</sub> angle, and the third letter specifies the orientation of the H<sub>a</sub> relative to the central C<sub>9</sub>—N<sub>10</sub>.



**Table S1.** Bond lengths and topological properties at bond critical points (BCPs) for A<sup>+</sup>TG<sup>-</sup> conformer of TRA in aqueous solution calculated at the B3LYP/6-311++G\*\* level of theory<sup>a</sup>

	Bond	Bond length	$\rho_b$	$\nabla^2\rho_b$	$\lambda_1$	$\lambda_2$	$\lambda_3$	E	$ \lambda_1 /\lambda_3$	$G_b/\rho_b$
Ring A	N <sub>1</sub> —C <sub>7a</sub>	1.378	0.303	-0.768	-0.613	-0.544	0.389	0.128	1.577	0.730
	N <sub>1</sub> —C <sub>2</sub>	1.382	0.298	-0.723	-0.596	-0.521	0.394	0.144	1.512	0.763
	C <sub>2</sub> —C <sub>3</sub>	1.379	0.317	-0.866	-0.676	-0.506	0.316	0.336	2.138	0.373
	C <sub>3</sub> —C <sub>3a</sub>	1.445	0.279	-0.690	-0.558	-0.475	0.344	0.175	1.623	0.305
	C <sub>3a</sub> —C <sub>7a</sub>	1.427	0.296	-0.792	-0.620	-0.518	0.345	0.198	1.795	0.307
	N <sub>1</sub> —H	1.023	0.325	-1.652	-1.259	-1.206	0.813	0.044	1.549	0.133
	C <sub>2</sub> —H	1.085	0.282	-0.978	-0.777	-0.747	0.545	0.040	1.424	0.119
Ring B	C <sub>3a</sub> —C <sub>4</sub>	1.410	0.297	-0.802	-0.614	-0.519	0.331	0.181	1.853	0.310
	C <sub>4</sub> —C <sub>5</sub>	1.393	0.308	-0.843	-0.645	-0.523	0.325	0.235	1.985	0.335
	C <sub>5</sub> —C <sub>6</sub>	1.415	0.296	-0.791	-0.611	-0.514	0.334	0.190	1.830	0.310
	C <sub>6</sub> —C <sub>7</sub>	1.394	0.307	-0.839	-0.643	-0.520	0.324	0.236	1.983	0.335
	C <sub>7</sub> —C <sub>7a</sub>	1.403	0.302	-0.826	-0.630	-0.522	0.326	0.209	1.936	0.320
	C <sub>4</sub> —H	1.089	0.278	-0.948	-0.743	-0.727	0.523	0.022	1.421	0.133
	C <sub>5</sub> —H	1.089	0.279	-0.947	-0.743	-0.724	0.520	0.026	1.428	0.136
	C <sub>6</sub> —H	1.089	0.279	-0.950	-0.745	-0.728	0.523	0.024	1.425	0.134
	C <sub>7</sub> —H	1.089	0.278	-0.945	-0.744	-0.726	0.525	0.024	1.417	0.132
Aminoethyl Moiety	C <sub>3</sub> —C <sub>8</sub>	1.504	0.250	-0.587	-0.478	-0.458	0.349	0.043	1.370	0.239
	C <sub>8</sub> —C <sub>9</sub>	1.547	0.236	-0.512	-0.449	-0.430	0.367	0.045	1.224	0.228
	C <sub>9</sub> —N <sub>10</sub>	1.469	0.260	-0.669	-0.510	-0.499	0.341	0.023	1.498	0.404
	C <sub>8</sub> —H <sub>a</sub>	1.100	0.271	-0.890	-0.698	-0.692	0.499	0.009	1.399	0.156
	C <sub>8</sub> —H <sub>b</sub>	1.098	0.273	-0.900	-0.703	-0.697	0.501	0.008	1.404	0.154
	C <sub>9</sub> —H <sub>a</sub>	1.097	0.277	-0.934	-0.735	-0.716	0.517	0.027	1.421	0.141
	C <sub>9</sub> —H <sub>b</sub>	1.097	0.278	-0.935	-0.736	-0.717	0.517	0.026	1.423	0.142
	N <sub>10</sub> —H <sub>a</sub>	1.023	0.331	-1.450	-1.197	-1.145	0.892	0.045	1.341	0.175
N <sub>10</sub> —H <sub>b</sub>	1.023	0.331	-1.450	-1.197	-1.145	0.893	0.045	1.341	0.175	

<sup>a</sup>  $\rho_b$ ,  $\nabla^2\rho_b$ ,  $G_b/\rho_b$ ,  $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$  are expressed in a.u. and bond lengths in Å

**Table S2a.** Second-order stabilization energies,  $E^{(2)}$ , calculated at the B3LYP/6-311++G\*\* level of theory for donation transferences in solution related to the group  $G^{+}$  <sup>a,b</sup>

Donor	Acceptor	Group $G^{+}$					
		$A^{+}G^{+}G^{-}$	% $\Delta$	$A^{+}G^{+}T$	% $\Delta$	$A^{+}G^{+}G^{+}$	% $\Delta$
LP <sub>N10</sub>	$\sigma^{*}_{C8-C9}$	8.49	-6.39	0.74	-28.16	0.70	-55.70
	$\sigma^{*}_{C8-Hb}$	0.61	-6.15	-	-	-	-
	$\sigma^{*}_{C9-Ha}$	1.36	4.62	1.21	2.54	7.07	4.59
	$\sigma^{*}_{C9-Hb}$	1.25	-27.33	7.35	-7.55	1.29	-
$\sigma_{C3a-C3}$	$\sigma^{*}_{C8-Hb}$	0.63	-7.35	0.56	-17.65	0.54	-19.40
$\sigma_{C2-C3}$	$\sigma^{*}_{C8-Ha}$	0.75	1.35	0.65	16.07	0.66	11.86
$\sigma_{C8-C9}$	$\pi^{*}_{C2-C3}$	2.61	-7.45	2.46	-3.91	2.27	20.74
$\sigma_{C8-Ha}$	$\sigma^{*}_{C2-C3}$	4.73	3.73	4.70	16.05	4.74	105.19
	$\pi^{*}_{C2-C3}$	0.90	-18.18	0.95	-46.93	0.95	-71.22
	$\sigma^{*}_{C9-Hb}$	2.64	2.33	2.66	-1.85	2.74	11.84
$\sigma_{C8-Hb}$	$\sigma^{*}_{C3a-C3}$	4.44	-3.90	4.50	-12.96	4.34	-29.08
	$\pi^{*}_{C2-C3}$	1.41	18.49	1.40	89.19	1.53	-
	$\sigma^{*}_{C9-N10}$	4.61	3.60	4.05	4.38	4.12	26.77
$\sigma_{C9-Ha}$	$\sigma^{*}_{N10-Ha}$	3.13	-5.72	-	-	-	-
	$\sigma^{*}_{N10-Hb}$	-	-	3.06	-5.26	-	-
$\sigma_{C9-Hb}$	$\sigma^{*}_{N10-Ha}$	-	-	-	-	3.00	-0.66
	$\sigma^{*}_{N10-Hb}$	3.09	-7.21	-	-	-	-
$\sigma_{N10-Ha}$	$\sigma^{*}_{C8-C9}$	-	-	3.10	6.53	-	-
	$\sigma^{*}_{C9-Ha}$	2.34	0.43	-	-	-	-
	$\sigma^{*}_{C9-Hb}$	-	-	-	-	2.41	8.56
$\sigma_{N10-Hb}$	$\sigma^{*}_{C8-C9}$	-	-	-	-	3.12	16.85
	$\sigma^{*}_{C9-Ha}$	-	-	2.24	1.36	-	-
	$\sigma^{*}_{C9-Hb}$	2.44	2.52	-	-	-	-
<b><math>\Sigma</math></b>		<b>45.43</b>		<b>39.63</b>		<b>39.48</b>	

<sup>a</sup> All values are expressed in  $\text{Kcal mol}^{-1}$

<sup>b</sup> % $\Delta$  represents the percentage values of changes of  $E^{(2)}$  in solution with respect to vacuum

**Table S2b.** Second-order stabilization energies,  $E^{(2)}$ , calculated at the B3LYP/6-311++G\*\* level of theory for donation transferences in solution related to the group  $G^-$  <sup>a,b</sup>

Donor	Acceptor	Group $G^-$					
		$A^+G^-G^-$	% $\Delta$	$A^+G^-G^+$	% $\Delta$	CGT	% $\Delta$
LP <sub>N10</sub>	$\sigma^*_{C8-C9}$	8.39	-6.26	0.80	-11.11	0.80	3.90
	$\sigma^*_{C9-Ha}$	1.19	-27.88	7.27	-6.68	1.08	-18.18
	$\sigma^*_{C9-Hb}$	1.35	4.65	1.14	-13.64	6.71	-4.28
$\sigma_{C3a-C3}$	$\sigma^*_{C3-C8}$	1.77	30.15	1.74	1.75	1.69	-1.17
$\sigma_{C2-C3}$	$\sigma^*_{C3-C8}$	2.16	18.03	2.12	-0.47	2.24	0.90
	$\sigma^*_{C2-H}$	1.14	-11.63	1.15	-8.00	1.21	-7.63
	$\sigma^*_{N1-H}$	2.94	-9.54	2.94	-7.84	2.92	-9.88
$\pi_{C2-C3}$	$\sigma^*_{C8-C9}$	3.81	3.81	3.74	1.36	-	-
$\sigma_{C3a-C7a}$	$\sigma^*_{C3-C8}$	5.18	2.98	5.20	1.76	5.03	-1.81
$\sigma_{C3-C8}$	$\sigma^*_{C3a-C3}$	2.31	27.62	2.28	0.88	2.15	1.90
$\sigma_{C8-C9}$	$\pi^*_{C2-C3}$	2.56	-6.57	2.40	-7.69	-	-
$\sigma_{C9-N10}$	$\sigma^*_{C8-Ha}$	0.88	0.00	1.13	-5.04	1.08	-3.57
$\sigma_{C8-Ha}$	$\sigma^*_{C2-C3}$	3.54	0.00	3.44	-4.71	3.23	-33.68
$\sigma_{C8-Hb}$	$\sigma^*_{C3a-C3}$	5.55	1.28	5.56	2.58	-	-
	$\sigma^*_{C8-Hb}$	2.72	-3.20	2.78	2.96	2.88	-0.35
	$\sigma^*_{N10-Ha}$	3.07	-8.36	-	-	-	-
$\sigma_{C9-Hb}$	$\sigma^*_{N10-Hb}$	-	-	-	-	2.90	-8.81
	$\sigma^*_{C3-C8}$	3.40	3.34	3.46	2.67	3.51	4.46
	$\sigma^*_{N10-Ha}$	-	-	3.04	-4.70	-	-
$\sigma_{N10-Ha}$	$\sigma^*_{N10-Hb}$	3.13	-6.01	-	-	-	-
	$\sigma^*_{C8-C9}$	-	-	-	-	3.03	7.83
	$\sigma^*_{C9-Ha}$	2.44	4.27	-	-	-	-
$\sigma_{N10-Hb}$	$\sigma^*_{C9-Hb}$	-	-	2.23	0.90	-	-
	$\sigma^*_{C8-C9}$	-	-	3.04	6.67	-	-
	$\sigma^*_{C9-Ha}$	-	-	-	-	2.42	6.61
	$\sigma^*_{C9-Hb}$	2.33	0.43	-	-	-	-
<b><math>\Sigma</math></b>		<b>59.86</b>		<b>55.46</b>		<b>42.88</b>	

<sup>a</sup>All values are expressed in Kcal mol<sup>-1</sup>

<sup>b</sup>% $\Delta$  represents the percentage values of changes of  $E^{(2)}$  in solution with respect to vacuum

**Table S2c.** Second-order stabilization energies,  $E^{(2)}$ , calculated at the B3LYP/6-311++G\*\* level of theory for donation transferences in solution related to the group T<sup>a,b</sup>

Donor	Acceptor	Group T'					
		CTG <sup>-</sup>	%Δ	CTG <sup>+</sup>	%Δ	CTT	%Δ
LP <sub>N10</sub>	σ* <sub>C3-C8</sub>	0.81	-1.22	-	-	-	-
	σ* <sub>C8-C9</sub>	7.71	-6.55	0.89	-22.02	0.85	-18.35
	σ* <sub>C9-Ha</sub>	1.27	-13.61	7.07	-5.36	1.06	-7.34
	σ* <sub>C9-Hb</sub>	1.27	-13.61	1.02	-7.47	7.06	-8.93
σ <sub>C3a-C3</sub>	σ* <sub>C8-C9</sub>	1.27	-2.31	1.26	-3.08	1.26	-3.08
σ <sub>C3a-C7a</sub>	σ* <sub>C7-C7a</sub>	2.79	-4.45	2.78	-4.79	2.78	-4.79
	σ* <sub>C3-C8</sub>	5.00	0.60	4.98	1.43	4.98	1.43
σ <sub>C3-C8</sub>	σ* <sub>C3a-C3</sub>	2.17	0.46	2.16	0.47	2.16	0.47
	σ* <sub>C9-N10</sub>	2.11	-0.47	1.76	0.57	1.75	1.15
σ <sub>C8-C9</sub>	π* <sub>C2-C3</sub>	-	-	0.86	2.38	-	-
	σ* <sub>C3-C8</sub>	0.95	0.00	-	-	0.86	2.38
σ <sub>C9-Ha</sub>	σ* <sub>C8-Ha</sub>	2.84	-1.39	2.84	4.80	2.91	-0.34
	σ* <sub>N10-Ha</sub>	3.03	-9.01	-	-	-	-
	σ* <sub>N10-Hb</sub>	-	-	-	-	2.97	-9.17
σ <sub>C9-Hb</sub>	σ* <sub>C8-Hb</sub>	2.85	-	2.91	-0.34	2.84	4.80
	σ* <sub>N10-Hb</sub>	3.04	-8.71	2.97	-9.17	-	-
σ <sub>N10-Ha</sub>	σ* <sub>C8-C9</sub>	-	-	-	-	2.78	6.51
	σ* <sub>C9-Ha</sub>	2.39	-	-	-	-	-
	σ* <sub>C9-Hb</sub>	-	-	2.30	3.60	-	-
σ <sub>N10-Hb</sub>	σ* <sub>C8-C9</sub>	-	-	2.78	6.51	-	-
	σ* <sub>C9-Ha</sub>	-	-	-	-	2.31	4.05
	σ* <sub>C9-Hb</sub>	2.39	4.37	-	-	-	-
<b>Σ</b>		<b>41.89</b>		<b>36.58</b>		<b>36.57</b>	

<sup>a</sup>All values are expressed in Kcal mol<sup>-1</sup>

<sup>b</sup>%Δ represents the percentage values of changes of  $E^{(2)}$  in solution with respect to vacuum

**Table S3.** Percentage values of the main changes in solution for bond lengths, electron density at BCPs, electron density at NCPs of hydrogen atom and polarization of C—H and N—H bonds, calculated at B3LYP/6-311++G\*\* level of theory for TRA conformers.

Bond Lengths												
Bond	Group T			Group G <sup>-</sup>			Group T <sup>+</sup>			Group G <sup>+</sup>		
	A <sup>+</sup> TG <sup>-</sup>	A <sup>+</sup> TG <sup>+</sup>	A <sup>+</sup> TT	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	CG <sup>-</sup> T	CTG <sup>-</sup>	CTG <sup>+</sup>	CTT	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>+</sup> T	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>
C <sub>8</sub> —H <sub>a</sub>	0.02	0.15	0.02	0.17	0.09	0.20	0.03	0.15	0.01	0.02	0.05	-0.10
C <sub>8</sub> —H <sub>b</sub>	-0.01	0.00	0.11	0.22	0.12	-0.05	0.02	0.02	0.16	0.04	0.05	0.06
C <sub>9</sub> —H <sub>a</sub>	0.08	-0.03	0.07	-0.58	-0.06	0.09	0.05	-0.08	0.03	0.04	0.04	0.05
C <sub>9</sub> —H <sub>b</sub>	0.08	0.07	-0.02	0.08	0.04	-0.05	0.05	0.04	-0.08	0.03	-0.08	0.18
N <sub>10</sub> —H <sub>a</sub>	0.61	0.59	0.60	0.58	0.43	0.56	0.61	0.58	0.61	0.44	0.63	0.56
N <sub>10</sub> —H <sub>b</sub>	0.61	0.61	0.58	0.54	0.61	0.51	0.61	0.61	0.60	0.58	0.46	0.60

Electron Density at BCP												
Bond	Group T			Group G <sup>-</sup>			Group T <sup>+</sup>			Group G <sup>+</sup>		
	A <sup>+</sup> TG <sup>-</sup>	A <sup>+</sup> TG <sup>+</sup>	A <sup>+</sup> TT	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	CG <sup>-</sup> T	CTG <sup>-</sup>	CTG <sup>+</sup>	CTT	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>+</sup> T	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>
C <sub>8</sub> —H <sub>a</sub>	0.08	-0.53	0.14	-0.06	-0.10	-0.53	0.06	-0.55	0.18	0.25	-0.23	0.49
C <sub>8</sub> —H <sub>b</sub>	0.26	0.31	-0.35	0.23	-0.37	0.31	0.09	0.15	-0.58	-0.04	0.06	-0.15
C <sub>9</sub> —H <sub>a</sub>	-0.18	0.14	-0.15	-0.21	0.20	-0.31	-0.03	0.34	0.03	0.06	0.04	0.01
C <sub>9</sub> —H <sub>b</sub>	-0.23	-0.19	0.05	0.02	0.05	0.29	-0.03	0.03	0.35	-0.05	0.29	-0.44
N <sub>10</sub> —H <sub>a</sub>	-1.34	-1.29	-1.33	-1.27	-1.01	-1.26	-1.33	-1.29	-1.34	-1.01	-1.36	-1.28
N <sub>10</sub> —H <sub>b</sub>	-1.32	-1.36	-1.28	-1.02	-1.33	-1.11	-1.32	-1.34	-1.31	-1.09	-1.09	-1.30

Electron Density at NCP of H atom												
Bond	Group T			Group G <sup>-</sup>			Group T <sup>+</sup>			Group G <sup>+</sup>		
	A <sup>+</sup> TG <sup>-</sup>	A <sup>+</sup> TG <sup>+</sup>	A <sup>+</sup> TT	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	CG <sup>-</sup> T	CTG <sup>-</sup>	CTG <sup>+</sup>	CTT	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>+</sup> T	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>
C <sub>8</sub> —H <sub>a</sub>	-0.19	0.06	-0.19	-0.15	-0.23	-0.50	-0.21	0.06	-0.18	-0.14	0.08	0.23
C <sub>8</sub> —H <sub>b</sub>	-0.31	-0.32	-0.05	-0.31	-0.11	-0.15	-0.19	-0.20	0.05	-0.30	-0.33	-0.61
C <sub>9</sub> —H <sub>a</sub>	-0.03	-0.10	-0.07	-0.03	-0.06	-0.02	-0.12	-0.18	-0.12	-0.13	-0.15	-0.25
C <sub>9</sub> —H <sub>b</sub>	0.03	-0.03	-0.08	-0.10	-0.15	-0.13	-0.11	-0.12	-0.17	-0.07	-0.05	0.08
N <sub>10</sub> —H <sub>a</sub>	-1.86	-1.77	-1.85	-1.93	-1.87	-1.59	-1.81	-1.86	-1.86	-1.23	-1.87	-1.77
N <sub>10</sub> —H <sub>b</sub>	-1.86	-1.93	-1.83	-1.20	-1.16	-1.77	-1.81	-1.78	-1.80	-1.99	-1.08	-1.66

Polarization of X—H bond, % of electron density on H												
Bond	Group T			Group G <sup>-</sup>			Group T <sup>+</sup>			Group G <sup>+</sup>		
	A <sup>+</sup> TG <sup>-</sup>	A <sup>+</sup> TG <sup>+</sup>	A <sup>+</sup> TT	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	CG <sup>-</sup> T	CTG <sup>-</sup>	CTG <sup>+</sup>	CTT	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	A <sup>+</sup> G <sup>+</sup> T	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>
C <sub>8</sub> —H <sub>a</sub>	0.35	-0.59	0.48	0.17	0.33	0.36	0.40	-0.56	0.53	0.42	-0.35	0.10
C <sub>8</sub> —H <sub>b</sub>	0.73	0.83	-0.54	0.72	-0.15	0.48	0.40	0.53	-0.54	0.46	0.70	0.97
C <sub>9</sub> —H <sub>a</sub>	-0.10	0.24	-0.03	-0.17	0.22	-0.15	0.13	0.48	0.19	0.22	0.27	0.31
C <sub>9</sub> —H <sub>b</sub>	-0.25	-0.13	0.95	0.22	0.29	0.51	0.12	0.19	0.48	0.07	0.31	-0.52
N <sub>10</sub> —H <sub>a</sub>	1.54	1.94	1.17	1.75	1.16	1.00	1.53	1.50	1.51	0.79	1.46	1.67
N <sub>10</sub> —H <sub>b</sub>	1.62	1.12	1.57	0.94	1.24	1.57	1.53	1.52	1.50	1.68	0.65	0.81

**Table S4a.** Summation of second-order stabilization energies,  $E^{(2)}$ , calculated at B3LYP/6-311++G\*\* level of theory for donation and back-donation transferences in solution related to C—H and N—H bonds<sup>a,b</sup>

Donation transferences													
Donor	Group T						Group G <sup>-</sup>						
	A <sup>+</sup> TG <sup>-</sup>	%Δ	A <sup>+</sup> TG <sup>+</sup>	%Δ	A <sup>+</sup> TT	%Δ	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	%Δ	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	%Δ	CGT	%Δ	
$\sigma_{C8-Ha}$	8.50	0.35	8.70	-1.15	8.60	-0.81	10.37	1.25	9.79	2.25	10.27	5.94	
$\sigma_{C8-Hb}$	7.97	1.51	8.07	1.86	8.13	0.25	8.08	2.10	8.11	1.85	8.34	9.23	
$\sigma_{C9-Ha}$	6.21	-6.44	2.69	3.72	6.17	-6.16	6.16	-6.01	2.70	2.96	6.07	-4.78	
$\sigma_{C9-Hb}$	6.13	-6.69	6.10	-6.56	2.64	2.65	6.62	-1.36	6.56	-0.91	3.36	4.46	
$\sigma_{N10-Ha}$	2.33	5.58	2.19	5.94	2.60	6.54	2.34	4.27	2.21	0.90	2.81	7.83	
$\sigma_{N10-Hb}$	2.30	5.22	2.61	6.51	2.23	5.38	2.32	0.43	2.85	6.67	2.27	6.61	

Back-Donation transferences													
Acceptor	Group T						Group G <sup>-</sup>						
	A <sup>+</sup> TG <sup>-</sup>	%Δ	A <sup>+</sup> TG <sup>+</sup>	%Δ	A <sup>+</sup> TT	%Δ	A <sup>+</sup> G <sup>-</sup> G <sup>-</sup>	%Δ	A <sup>+</sup> G <sup>-</sup> G <sup>+</sup>	%Δ	CGT	%Δ	
$\sigma^*_{C8-Ha}$	5.57	-2.69	5.38	2.79	5.63	-2.31	3.63	-12.40	3.34	3.59	2.85	30.53	
$\sigma^*_{C8-Hb}$	3.65	-5.48	3.71	-2.96	3.51	1.42	3.73	-5.63	3.48	2.30	6.81	-8.96	
$\sigma^*_{C9-Ha}$	4.94	3.64	2.70	0.00	4.92	2.44	4.94	4.05	2.69	0.37	5.15	2.52	
$\sigma^*_{C9-Hb}$	4.93	3.45	4.87	3.29	2.71	0.00	3.49	0.00	3.48	-0.86	1.06	-12.26	
$\sigma^*_{N10-Ha}$	3.38	-9.76	3.29	-10.33	1.79	-11.73	3.35	-8.36	3.19	-4.70	1.82	-12.09	
$\sigma^*_{N10-Hb}$	3.38	-9.76	1.79	-11.73	3.29	-10.03	3.33	-6.01	1.88	-12.77	3.18	-8.81	

<sup>a</sup>All values are expressed in Kcal mol<sup>-1</sup>

<sup>b</sup>%Δ represents the percentage values of summation of  $E^{(2)}$  in solution with respect to vacuum



**Table S4b.** Summation of second-order stabilization energies,  $E^{(2)}$ , calculated at B3LYP/6-311++G\*\* level of theory for donation and back-donation transferences in solution related to C—H and N—H bonds<sup>a,b</sup>

Donation transferences												
Donor	Group G <sup>+</sup>						Group T <sup>+</sup>					
	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	% $\Delta x$ <sup>b</sup>	A <sup>+</sup> G <sup>+</sup> T	% $\Delta x$	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>	% $\Delta x$	CTG <sup>-</sup>	% $\Delta x$	CTG <sup>+</sup>	% $\Delta x$	CTT	% $\Delta x$
$\sigma_{N1-H}$	3.75	10.40	3.72	9.95	3.68	10.05	3.66	10.93	3.66	10.93	3.66	10.93
$\sigma_{C2-H}$	6.82	2.20	6.65	1.50	6.55	2.29	6.50	1.85	6.50	2.00	6.50	2.00
$\sigma_{C4-H}$	10.07	1.99	10.33	-11.04	10.50	-12.57	9.00	1.89	9.02	1.66	9.02	1.66
$\sigma_{C5-H}$	8.17	1.22	8.21	6.94	8.20	6.71	8.55	1.64	8.56	1.52	8.56	1.52
$\sigma_{C6-H}$	8.13	1.48	8.11	3.08	8.04	3.73	8.23	1.82	8.22	1.95	8.22	1.95
$\sigma_{C7-H}$	9.52	2.84	9.50	3.26	9.47	3.17	9.44	3.28	9.43	3.39	9.43	3.39
$\sigma_{C8-Ha}$	8.24	0.36	8.55	-2.81	8.83	-4.53	9.38	-0.21	9.61	-1.46	9.49	-0.84
$\sigma_{C8-Hb}$	10.26	1.95	9.79	1.63	9.93	0.60	9.37	-0.11	9.48	-0.84	9.61	-1.56
$\sigma_{C9-Ha}$	6.68	-2.10	6.71	-2.09	3.45	4.93	6.21	-5.48	2.71	4.80	6.19	-5.01
$\sigma_{C9-Hb}$	6.23	-5.14	2.75	4.73	5.42	8.30	6.21	-5.15	6.19	-5.01	2.71	4.80
$\sigma_{N10-Ha}$	2.33	0.43	3.43	-9.62	2.22	8.56	2.29	4.37	2.22	3.60	2.61	6.51
$\sigma_{N10-Hb}$	2.38	2.52	2.21	1.36	3.28	-4.88	2.29	4.37	2.61	6.51	2.22	4.05

Back-Donation transferences												
Acceptor	Group G <sup>+</sup>						Group T <sup>+</sup>					
	A <sup>+</sup> G <sup>+</sup> G <sup>-</sup>	% $\Delta x$	A <sup>+</sup> G <sup>+</sup> T	% $\Delta x$	A <sup>+</sup> G <sup>+</sup> G <sup>+</sup>	% $\Delta x$	CTG <sup>-</sup>	% $\Delta x$	CTG <sup>+</sup>	% $\Delta x$	CTT	% $\Delta x$
$\sigma^*_{N1-H}$	8.66	-13.97	8.61	-14.05	8.70	-14.71	8.60	-14.07	8.61	-14.17	7.39	-14.17
$\sigma^*_{C2-H}$	8.70	-5.17	8.55	-5.85	8.62	-6.26	8.64	-4.86	8.71	-5.63	8.22	-5.63
$\sigma^*_{C4-H}$	7.35	-2.45	7.09	-3.10	7.15	-3.92	6.93	-1.59	6.90	-1.16	6.82	-1.16
$\sigma^*_{C5-H}$	5.86	-1.02	5.89	-1.02	5.93	-1.52	5.92	-1.52	5.92	-1.52	5.83	-1.52
$\sigma^*_{C6-H}$	5.89	-1.36	5.92	-1.18	6.00	-2.33	5.91	-1.35	5.92	-1.52	5.83	-1.52
$\sigma^*_{C7-H}$	6.85	-3.80	6.88	-4.07	6.94	-4.76	6.85	-3.94	6.86	-4.08	6.58	-4.08
$\sigma^*_{C8-Ha}$	4.68	-5.98	4.89	-10.22	5.50	-21.27	5.91	0.17	5.75	4.00	5.74	-1.20
$\sigma^*_{C8-Hb}$	2.34	3.42	1.82	41.76	2.16	17.59	5.91	-1.18	5.81	-0.17	6.04	5.04
$\sigma^*_{C9-Ha}$	3.50	-0.29	3.96	-12.63	1.50	-26.00	5.14	1.95	2.93	-1.71	5.17	1.57
$\sigma^*_{C9-Hb}$	4.96	2.42	2.71	-1.85	5.28	-2.46	5.14	1.95	5.09	1.38	2.88	-1.71
$\sigma^*_{N10-Ha}$	3.32	-5.72	1.85	-11.89	3.02	-0.66	3.33	-9.01	3.27	-9.17	1.58	-12.22
$\sigma^*_{N10-Hb}$	3.33	-7.21	3.23	-5.26	1.74	-5.75	3.33	-8.71	1.80	-12.22	2.97	-9.17

<sup>a</sup>All values are expressed in Kcal mol<sup>-1</sup>

<sup>b</sup>% $\Delta x$  : Percentage values of summation of  $E^{(2)}$  in solution with respect to vacuum