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X-ray structure analysis: Siemens P4RA four circle diffractometer, MoK α radiation ($\lambda = 0.71073 \text{ \AA}$), graphit monochromator, rotating anode generator, szintillation counter, 150 K, no absorption corrections, SHELXTL-PLUS programs, direct methods, least-squares refinements, one isotropic instinction parameter.

6·CH₂Cl₂: C₂₂H₂₄O₂Cl₂, formula weight 391.31, triclinic, space group *P1*bar, $a = 8.109(4)$, $b = 10.514(5)$, $c = 12.695(6) \text{ \AA}$, $\alpha = 103.72(4)$, $\beta = 91.97(4)$, $\gamma = 109.00(4)^\circ$, $V = 986.82 \text{ \AA}^3$, $Z = 2$, $\rho_{\text{ber.}} = 1.317 \text{ gcm}^{-3}$, $\mu(\text{MoK}\alpha) = 0.34 \text{ mm}^{-1}$, crystal dimensions ca. $0.52 \cdot 0.27 \cdot 0.22 \text{ mm}$, ω -scan, $2\theta_{\text{max}} = 54^\circ$, 3466 independent reflections, $R(R_w) = 0.0626 (0.0619)$ for 2305 observed reflections ($I > 2\sigma(I)$), 237 variables, non-hydrogen atoms anisotropic, H atoms at idealized positions.

14: C₁₄H₁₆O₂, formula weight 216.27, monoklinic, space group *P2*₁/*c*, $a = 12.404(1)$, $b = 5.179(1)$, $c = 17.345(2) \text{ \AA}$, $\beta = 98.22(1)^\circ$, $V = 1102.86 \text{ \AA}^3$, $Z = 4$, $\rho_{\text{ber.}} = 1.303 \text{ gcm}^{-3}$, $\mu(\text{MoK}\alpha) = 0.09 \text{ mm}^{-1}$, crystal dimensions ca. $0.60 \cdot 0.22 \cdot 0.17 \text{ mm}$, ω -scan, $2\theta_{\text{max}} = 54^\circ$, 2412 independent reflections, $R(R_w) = 0.0370 (0.0452)$ for 2025 observed reflections ($I > 2\sigma(I)$), 147 variables, non-hydrogen atoms anisotropic, H atoms at idealized positions.

Further details of the crystal structure investigation may be obtained from the Fachinformationsdienst Karlsruhe, D-76344 Eggenstein-Leopoldshafen, on quoting the depository number CSD-59449.

Additional spectroscopic data and assignments of NMR signals based upon two-dimensional NMR experiments:

***trans*-2-(4-Methylbenzoyl)-1-(2-oxopropyl)-1,2,3,4-tetrahydronaphthalene (*trans*-5):** ¹H NMR (300 MHz): $\delta = 1.83$ - 1.96 (m, 2H, 3-H), 2.09 (s, 3H), 2.40 (s, 3H), 2.76 - 3.00 (m, 4H), 3.79 - 3.99 (m, 2H, 1-H, 2-H), 7.06 - 7.27 (m, 6H, 5-H, 6-H, 7-H, 8-H, 3'-H, 5'-H), 7.85 - 7.89 (m, 2H, 2'-H, 6'-H). ¹³C NMR (75

MHz): δ = 21.53 (q), 25.50 (t, C-3), 28.03 (t, C-4), 30.41 (q), 35.01 (d, C-1), 45.85 (d, C-2), 49.80 (t), 125.73 (d), 126.21 (d), 127.55 (d), 128.47 (d), 128.69 (d), 129.33 (d), 133.84 (s), 136.17 (s), 138.65 (s), 143.73 (s), 201.97 (s), 207.71 (s). Anal. calcd for $C_{21}H_{22}O_2$: C 82.32, H 7.24; found C 82.34, H 7.22.

cis-5: 1H NMR (300 MHz): δ = 1.98 (s, 3H), 2.11-2.26 (m, 2H, 3-H), 2.40 (s, 3H), 2.89-2.99 (m, 4H), 3.82 (ddd, J = 12.1 Hz, 4.5 Hz, 2.9 Hz, 1H, 2-H), 3.98 ("q", " J " = 5.2 Hz, 1H, 1-H), 7.11-7.26 (m, 6H, 5-H, 6-H, 7-H, 8-H, 3'-H, 5'-H), 7.84-7.86 (m, 2H, 2'-H, 6'-H). ^{13}C -NMR (75 MHz): δ = 20.64 (t, C-3), 21.64 (q), 28.18 (t, C-4), 30.40 (q), 35.57 (d, C-1), 44.71 (d, C-2), 47.39 (t), 126.56 (d), 128.28 (d), 128.86 (d), 129.14 (d), 129.24 (d), 129.39 (d), 134.11 (s), 135.32 (s), 140.22 (s), 143.93 (s), 202.77 (s), 206.47 (s).

(1R*,4aR*,10aS*)-1,4,4a,9,10,10a-Hexahydro-1-hydroxy-1-(4-methylphenyl)-phenanthren-3(2H)-one (6): IR (KBr): 3372 (O-H), 1710 (s, C=O) cm^{-1} . - 1H NMR (300 MHz): δ = 1.54 (m, 2H, 10-H), 2.17 (s, 1H, OH), 2.20-2.29 (m, 1H, 10a-H), 2.37 (s, 3H), 2.50 (d, J = 13.0 Hz, 1H, 4-H), 2.58 (d, J = 14.6 Hz, 1H, 2-H), 2.79 (t, J = 6.4 Hz, 2H, 9-H), 2.98 (d, J = 14.6 Hz, 1H, 2-H), 3.25 (dq, J = 13.8 Hz, 2.2 Hz, 1H, 4-H), 3.47-3.57 (m, 1H, 4a-H), 7.07-7.25 (m, 6H), 7.32-7.36 (m, 2H, 2'-H, 6'-H). ^{13}C NMR (75 MHz): δ = 20.98 (q), 22.70 (t, C-10), 29.89 (t, C-9), 38.19 (d, C-4a), 46.28 (t, C-4), 47.37 (d, C-10a), 56.32 (t, C-2), 79.22 (s, C-1), 124.45 (d), 125.54 (d), 126.14 (d), 126.20 (d), 128.93 (d), 129.38 (d), 136.57 (s), 136.91 (s), 139.03 (s), 142.37 (s, C-1'), 208.94 (s, C-3). - MS (EI): 306 (5) [M^+], 176 (45), 130 (100), 119 (64). Anal. Calcd for $C_{21}H_{22}O_2$: C 82.32, H 7.24; found C 82.25, H 7.25.

E-4-[2-(4-hydroxy-4-p-tolyl-1-buten-1-yl)-phenyl]-3-buten-2-one (4): IR (KBr): 3434 (O-H), 1667 (s, C=O), 1605, 1594 cm^{-1} . 1H NMR (300 MHz): δ = 2.13 (s, 1H, OH), 2.31 (s, 6H), 2.65-2.71 (m, 2H), 4.77 (t, J = 6.8 Hz, 1H), 6.05 (dt, J = 15.7 Hz, 7.2 Hz, 1H), 6.56 (d, J = 16.1 Hz, 1H), 6.71 (d, J = 15.7 Hz, 1H), 7.10-7.49 (m, 8H), 7.79 (d, J = 16.1 Hz, 1H). ^{13}C NMR (75 MHz): δ = 21.01 (q), 27.55 (q), 42.98 (t), 73.59 (d), 118.41 (d), 125.75 (d), 126.89 (d), 127.33 (d), 127.35 (d), 128.53 (d),

129.04 (d), 129.63 (d), 130.04 (d), 132.08 (s), 137.11 (s), 138.08 (s), 140.98 (s), 141.38 (d), 198.42 (s). MS (EI): 304 (9) [M^+], 186 (65), 128 (100), 121 (49). Anal. Calcd for $C_{21}H_{22}O_2$: C 82.32, H 7.24; found C 82.21, H 7.20.

1-(4-methylphenyl)-4a,9,10,10a-tetrahydrophenanthren-3(4H)-one (7): - IR (KBr): 1663 (C=O), 1608 cm^{-1} . 1H NMR (300 MHz): δ = 1.78-1.85 (m, 2H, 10-H), 2.32 (s, 3H), 2.44-2.65 (m, 2H, 4-H, 10a-H), 2.79-2.90 (m, 2H, 9-H), 3.14-3.23 (m, 1H, 4-H), 3.48 (dt, J = 13.0 Hz, 5.3 Hz, 1H, 4a-H), 6.33 (s, 1H, 2-H), 7.04-7.18 (m, 6H), 7.37-7.41 (m, 2H, 2'-H, 6'-H). ^{13}C NMR (75 MHz): δ = 21.32 (q), 23.40 (t, C-10), 29.93 (t, C-9), 37.16 (d, C-10a), 37.99 (d, C-4a), 42.57 (t, C-4), 124.38 (d), 126.29 (d), 126.62 (d), 126.68 (d), 128.88 (d), 129.30 (d), 129.75 (d), 134.83 (s), 135.30 (s), 138.87 (s), 140.63 (s, C-1'), 163.48 (s, C-1), 199.02 (s, C-3). MS (EI): 289 (23) [$M+1$], 288 (100) [M^+], 142 (39), 128 (47). Anal. Calcd for $C_{21}H_{20}O$: C 87.46, H 6.99; found C 87.65, H 7.19.

(1R*,4aR*,10aS*)-1,4,4a,9,10,10a-Hexahydro-1-hydroxyphenanthren-3(2H)-one (14): IR (KBr): 3379 (OH), 1696 (CO) cm^{-1} . 1H NMR (500 MHz): δ = 1.84-1.98 (m, 3H, 10-H, 10a-H), 2.01 (s, 1H, OH), 2.31 (dd, J = 14.0, 13.1 Hz, 1H, 4- H_{ax}), 2.66 (m, 2H, 2-H), 2.99 (m, 2H, 9-H), 3.16 ("dd", " J " = 14.3, 4.3 Hz, 1H, 4- H_{eq}), 3.40 (m, 1H, 4a-H), 4.40 ("s", 1H, 1-H), 7.12-7.21 (m, 4H). ^{13}C NMR (125 MHz): δ = 26.03 (t, C-10), 30.03 (t, C-9), 35.50 (d, C-4a), 43.29 (d, C-10a), 46.39 (t, C-4), 49.67 (t, C-2), 72.49 (d, C-1), 125.79 (d), 126.17 (d), 126.19 (d), 129.13 (d), 136.18 (s), 138.70 (s), 209.58 (s, C-3). MS (EI): 216 (12) [M^+], 198 (100) [M^+-H_2O]. Anal. Calcd for $C_{14}H_{16}O_2$: C 77.75, H 7.46; found: C 77.56, H 7.45.

(4aR*,10aR*)-4a,9,10,10a-Tetrahydrophenanthren-3(4H)-one (trans-8): IR (film): 1675 (CO) cm^{-1} . 1H NMR (500 MHz): δ = 1.72 (m, 1H, 10- H_{ax}), 2.19 (m, 1H, 10- H_{eq}), 2.37 (dd, J = 16.5, 13.8 Hz, 1H, 4- H_{ax}), 2.46 (m, 1H, 10a-H), 2.99-3.13 (m, 3H, 4a-H, 9-H), 3.24 (dd, J = 16.4, 3.9 Hz, 1H, 4- H_{eq}), 6.10 (d, J = 9.9 Hz, 1H, 2-H), 6.94 (dd, J = 9.9, 1.9 Hz, 1H, 1-H), 7.11-7.20 (m,

4H). ^{13}C NMR (75 MHz): δ = 28.32 (t, C-10), 29.50 (t, C-9), 39.29 (d, C-10a), 41.28 (d, C-4a), 42.52 (t, C-4), 124.65 (d), 126.15 (d), 126.56 (d), 129.31 (d), 129.65 (d), 135.92 (s), 137.45 (s), 155.23 (d, C-1), 199.49 (s). MS (EI): 199 (15) [$\text{M}^+ + 1$], 198 (100) [M^+]. Anal. Calcd for $\text{C}_{14}\text{H}_{14}\text{O}$: C 84.81, H 7.12; found: C 84.76, H 7.12.

(4aR*,10aS*)-4a,9,10,10a-Tetrahydrophenanthren-3(4H)-one (cis-8): IR (film): 1675 (CO) cm^{-1} . ^1H NMR (500 MHz): δ = 1.83 (m, 1H, 10- H_{ax}), 1.99 (m, 1H, 10- H_{eq}), 2.63 (m, 2H, 4-H), 2.72 (m, 1H, 10a-H), 2.93 (m, 2H, 9-H), 3.46 ("dt", " J " = 11.8, 5.7 Hz, 1H, 4a-H), 6.06 ("ddd", " J " = 10.1, 1.3, 0.7 Hz, 1H, 2-H), 7.02 (dd, J = 10.1, 5.2 Hz, 1H, 1-H), 7.12-7.20 (m, 4H). ^{13}C NMR (75 MHz): δ = 23.43 (t, C-10), 29.58 (t, C-9), 35.45 (d, C-10a), 37.18 (d, C-4a), 43.29 (t, C-4), 126.33 (d), 126.50 (d), 128.64 (d), 128.86 (d, C-2), 129.22 (d), 135.33 (s), 138.18 (s), 153.24 (d, C-1), 199.03 (s, C-3). MS (EI): 199 (18) [$\text{M}^+ + 1$], 198 (100) [M^+]. Anal. Calcd for $\text{C}_{14}\text{H}_{14}\text{O}$: C 84.81, H 7.12; found: C 84.75, H 7.06.

(4aR*,10aR*)-2-Methyl-4a,9,10,10a-tetrahydrophenanthren-3(4H)-one (trans-9): IR (film): 1670 (CO) cm^{-1} . ^1H NMR (500 MHz): δ = 1.71 (m, 1H, 10- H_{ax}), 1.84 (dd, J = 2.5, 1.5 Hz, 3H, CH_3), 2.15 (m, 1H, 10- H_{eq}), 2.37 (dd, J = 16.5, 13.9 Hz, 1H, 4- H_{ax}), 2.45 (m, 1H, 10a-H), 2.95-3.09 (m, 3H, 4a-H, 9-H), 3.37 (dd, J = 16.5, 3.9 Hz, 1H, 4- H_{eq}), 6.69 ("quint.", " J " = 1.6 Hz, 1H, 1-H), 7.12-7.22 (m, 4H). ^{13}C NMR (125 MHz): δ = 15.72 (q, CH_3), 28.61 (t, C-10), 29.52 (t, C-9), 39.48 (d, C-10a), 41.63 (d, C-4a), 42.65 (t, C-4), 124.78 (d), 126.11 (d), 126.49 (d), 129.33 (d), 135.76 (s), 136.02 (s), 137.67 (s), 150.51 (d, C-1), 199.70 (s, C-3). MS (EI): 213 (11) [$\text{M}^+ + 1$], 212 (63) [M^+], 169 (100). Anal. Calcd for $\text{C}_{15}\text{H}_{16}\text{O}$: C 84.87, H 7.60; found: C 84.70, H 7.54.

(4aR*,10aS*)-2-methyl-4a,9,10,10a-tetrahydrophenanthren-3(4H)-one (cis-9): ^1H NMR (500 MHz): Selected signals: δ = 1.81 ("t", " J " = 1.4 Hz, 3H, CH_3), 1.96 (m, 1H, 10- H_{eq}), 3.45 ("dt", " J " = 12.2, 5.6 Hz, 1H, 4a-H), 6.75 (dq, J = 5.7, 1.4 Hz, 1H, 1-H). ^{13}C NMR (75 MHz): δ = 15.82 (q, CH_3),

23.55 (t, C-10), 29.61 (t, C-9), 35.69 (d, C-10a), 37.55 (d, C-4a), 43.62 (t, C-4), 126.25 (d), 126.40 (d), 128.68 (d), 129.19 (d), 134.85 (s), 135.52 (s), 138.43 (s), 148.42 (d, C-1), 199.22 (s, C-3).

(4aR*,10aR*)-10a-Methyl-4a,9,10,10a-tetrahydro-phenanthren-3(4H)-one (trans-10): IR (film): 1675 (CO) cm^{-1} . ^1H NMR (500 MHz): δ = 0.96 (s, 3H, CH_3), 1.89 (m, 2H, 10-H), 2.52 (dd, J = 17.3, 14.1 Hz, 1H, 4- H_{ax}), 3.01 (m, 2H, 9-H), 3.10 (dd, J = 17.3, 4.5 Hz, 1H, 4- H_{eq}), 3.29 (dd, J = 14.0, 4.4 Hz, 1H, 4a-H), 5.99 (dd, J = 9.9, 0.9 Hz, 1H, 2-H), 6.91 (d, J = 9.9 Hz, 1H, 1-H), 7.11-7.20 (m, 4H). ^{13}C NMR (75 MHz): δ = 17.12 (q, CH_3), 25.74 (t, C-9), 34.56 (t, C-10), 35.27 (s, C-10a), 37.23 (t, C-4), 42.97 (d, C-4a), 124.51 (d), 126.10 (d), 126.40 (d), 127.24 (d, C-2), 128.98 (d), 135.22 (s), 136.76 (s), 160.98 (d, C-1), 199.52 (s, C-3). MS (EI): 213 (16) [$\text{M}^+ + 1$], 212 (90) [M^+], 197 (42) [$\text{M}^+ - \text{CH}_3$], 95 (100). Anal. Calcd for $\text{C}_{15}\text{H}_{16}\text{O}$: C 84.87, H 7.60; found: C 84.75, H 7.60.

(4aR*,10aS*)-10a-Methyl-4a,9,10,10a-tetrahydrophenanthren-3(4H)-one (cis-10): ^1H NMR (500 MHz): Selected Signals: δ = 1.16 (s, 3H, CH_3), 1.67 ("ddd", " J " = 13.5, 3.8, 1.3 Hz, 1H, 10- H_{eq}), 2.54 (dd, J = 16.9, 12.7 Hz, 1H, 4- H_{ax}), 2.66 (ddd, J = 16.9, 4.8, 0.8 Hz, 1H, 4- H_{eq}), 2.90 (m, 2H, 9-H), 5.96 (dd, J = 10.1, 0.8 Hz, 1H, 2-H), 6.73 (d, J = 10.1 Hz, 1H, 1-H). ^{13}C NMR (75 MHz): δ = 24.37 (q, CH_3), 25.79 (t, C-9), 28.58 (t, C-10), 35.04 (s, C-10a), 43.78 (d, C-4a), 44.10 (t, C-4), 126.10 (d), 126.37 (d), 127.02 (d), 129.15 (d), 129.16 (d), 134.20 (s), 137.85 (s), 159.10 (d, C-1), 199.36 (s, C-3).

(4aR*,10aS*)-4a,9,10,10a-Tetrahydrophenanthren-1(4H)-one (trans-11): IR (film): 1672 (CO) cm^{-1} . ^1H NMR (500 MHz): δ = 1.59 (m, 1H, 10- H_{ax}), 2.36 (m, 1H, 10a-H), 2.42 ("ddq", " J " = 19.5, 12.0, 2.1 Hz, 1H, 4- H_{ax}), 2.54 (m, 1H, 10- H_{eq}), 2.90 (m, 2H, 9-H), 3.09-3.18 (m, 2H, 4- H_{eq} , 4a-H), 6.15 (ddd, J = 10.0, 3.0, 0.9 Hz, 1H, 2-H), 7.08 (ddd, J = 10.0, 5.8, 2.1 Hz, 1H, 3-H), 7.11-7.22 (m, 3H), 7.27 ("d", " J " = 7.5 Hz, 1H, 5-H). ^{13}C NMR (75

MHz): δ = 21.54 (t, C-10), 29.18 (t, C-9), 32.47 (t, C-4), 39.76 (d, C-4a), 48.91 (d, C-10a), 125.62 (d, C-5), 126.09 (d), 126.40 (d), 129.35 (d), 129.76 (d, C-2), 136.69 (s), 137.80 (s), 148.50 (d, C-3), 200.55 (s, C-1). MS (EI): 199 (16) [M^+ +1], 198 (100) [M^+]. Anal. Calcd for $C_{14}H_{14}O$: C 84.81, H 7.12; found: C 84.76, H 7.11.

(4aR*,10aR*)-4a,9,10,10a-Tetrahydro-phenanthren-1(4H)-one (cis-11): IR (film): 1665 (CO) cm^{-1} . 1H NMR (500 MHz): δ = 1.94 (m, 2H, 10-H), 2.43 ("ddt", "J" = 19.4, 11.0, 2.6 Hz, 1H, 4- H_{ax}), 2.60 ("dtd", "J" = 19.4, 5.7, 1.2 Hz, 1H, 4- H_{eq}), 2.70 ("dt", "J" = 12.2, 4.5 Hz, 1H, 10a-H), 2.93 (m, 2H, 9-H), 3.40 (m, 1H, 4a-H), 6.10 (dddd, J = 10.2, 1.2, 0.7 Hz, 1H, 2-H), 6.96 ("dddd", "J" = 10.2, 5.7, 2.5, 0.4 Hz, 1H, 3-H), 7.09-7.18 (m, 4H). ^{13}C NMR (75 MHz): δ = 21.28 (t, C-10), 28.83 (t, C-9), 31.82 (t, C-4), 37.45 (d, C-4a), 46.20 (d, C-10a), 126.04 (d), 126.60 (d), 128.38 (d), 129.10 (d, C-2), 129.35 (d), 135.35 (s), 138.23 (s), 148.94 (d, C-3), 202.04 (s, C-1). MS (EI): 199 (16) [M^+ +1], 198 (100) [M^+], 130 (99). Anal. Calcd for $C_{14}H_{14}O$: C, 84.81; H, 7.12. Found: C, 84.72; H, 7.18.

(4aR*,10aS*)-2-Methyl-4a,9,10,10a-tetrahydro-phenanthren-1(4H)-one (trans-12): IR (film): 1672 (CO) cm^{-1} . 1H NMR (500 MHz): δ = 1.57 (m, 1H, 10- H_{ax}), 1.85 ("q", "J" = 1.3 Hz, 3H, CH_3), 2.31 (m, 1H, 10a-H), 2.45 ("ddt", "J" = 19.2, 12.0, 2.5 Hz, 1H, 4- H_{ax}), 2.56 ("ddt", "J" = 13.5, 5.4, 2.9 Hz, 1H, 10- H_{eq}), 2.89 (m, 2H, 9-H), 3.05-3.13 (m, 2H, 4- H_{eq} , 4a-H), 6.83 (m, 1H, 3-H), 7.01-7.21 (m, 3H), 7.27 ("d", "J" = 7.5 Hz, 1H, 5-H). ^{13}C NMR (75 MHz): δ = 15.97 (q, CH_3), 21.84 (t, C-10), 29.31 (t, C-9), 32.40 (t, C-4), 40.02 (d, C-4a), 48.83 (d, C-10a), 125.56 (d, C-5), 126.04 (d), 126.30 (d), 129.28 (d), 135.62 (s), 136.68 (s), 138.16 (s), 143.27 (d, C-3), 200.70 (s, C-1). MS (EI): 213 (16) [M^+ +1], 212 (100) [M^+], 197 (33) [M^+-CH_3], 130 (80). Anal. Calcd for $C_{15}H_{16}O$: C 84.87, H 7.60; found: C 84.75, H 7.61.

(4aR*,10aR*)-2-Methyl-4a,9,10,10a-tetrahydrophenanthren-1(4H)-one (cis-12): IR (film): 1664 (CO) cm^{-1} . 1H NMR: δ = 1.83 ("dt", "J" = 2.6, 1.4 Hz, 3H, CH_3),

1.93 (m, 2H, 10-H), 2.43 ("ddt", " J " = 19.1, 11.2, 2.6 Hz, 1H, 4-H_{ax}), 2.54 ("ddt", " J " = 19.1, 5.8, 1.3 Hz, 1H, 4-H_{eq}), 2.71 (ddd, J = 12.4, 5.1, 3.8 Hz, 1H, 10a-H), 2.93 (m, 2H, 9-H), 3.39 ("dt", J = 11.2, 5.4 Hz, 1H, 4a-H), 6.72 (m, 1H, 3-H), 7.09-7.17 (m, 4H). ¹³C NMR: δ = 16.05 (q, CH₃), 21.40 (t, C-10), 29.02 (t, C-9), 32.13 (t, C-4), 37.96 (d, C-4a), 46.27 (d, C-10a), 126.03 (d), 126.52 (d), 128.38 (d), 129.33 (d), 135.01 (s), 135.47 (s), 138.66 (s), 143.91 (d, C-3), 201.96 (s, C-1). MS (EI): 213 (17) [M⁺+1], 212 (100) [M⁺], 197 (39) [M⁺-CH₃], 130 (98). Anal. Calcd for C₁₅H₁₆O: C 84.87, H 7.60; found: C 84.93, H 7.64.

10a-Methyl-4a,9,10,10a-tetrahydrophenanthren-1(4H)-one (13): signals of **cis-13**: δ = 1.15 ("s", 3H, CH₃), 1.56 ("dtd", " J " = 13.3, 4.9, 1.4 Hz, 1H, 10-H_{eq}), 2.09 (dt, J = 13.4, 9.0 Hz, 1H, 10-H_{ax}), 2.44 (ddt, J = 19.5, 10.2, 2.7 Hz, 1H, 4-H_{ax}), 2.62 (dtd, J = 19.5, 5.2, 1.2 Hz, 1H, 4-H_{eq}), 2.90 (m, 2H, 9-H), 3.05 (m, 1H, 4a-H), 6.04 (ddd, J = 10.1, 2.7, 1.2 Hz, 1H, 2-H), 6.87 (ddd, J = 10.0, 5.5, 2.7 Hz, 1H, 3-H), 7.08-7.16 (m, 4H). Selected signals of **trans-13**: δ = 0.98 (d, J = 0.5 Hz, 3H, CH₃), 1.76 (m, 1H, 10-H_{ax}), 2.25 (ddd, J = 13.8, 5.3, 3.5 Hz, 1H, 10-H_{eq}), 3.21 (dd, J = 11.2, 4.8 Hz, 1H, 4a-H), 7.02 ("ddd", " J " = 10.1, 5.9, 2.2 Hz, 1H, 3-H), 7.24 (m, 1H). ¹³C NMR (125 MHz): signals of **cis-13**: δ = 20.01 (q, CH₃), 25.07 (t, C-9), 26.50 (t, C-10), 33.10 (t, C-4), 44.03 (s, C-10a), 44.12 (d, C-4a), 126.01 (d), 126.41 (d), 128.59 (d), 128.81 (d, C-2), 129.31 (d), 134.51 (s), 138.41 (s), 147.30 (d, C-3), 204.41 (s, C-1). Signals of **trans-13**: δ = 15.00 (q, CH₃), 25.63 (t, C-9), 27.59 (t, C-4), 28.62 (t, C-10), 41.73 (d, C-4a), 43.52 (s, C-10a), 125.53 (d), 126.06 (d), 126.27 (d), 127.99 (d, C-2), 129.11 (d), 135.62 (s), 136.65 (s), 147.27 (d, C-3), 204.95 (s, C-1). MS (EI): 213 (8) [M⁺+1], 212 (43) [M⁺], 197 (96) [M⁺-CH₃], 129 (100). Anal. Calcd for C₁₅H₁₆O: C 84.87, H 7.60; found: C 84.62, H 7.54.

E-3-[2-(4-Oxo-1-hexyl)-phenyl]-propenal 15: IR (film): 1710 (COCH₂CH₃), 1675 (CHO) cm⁻¹. ¹H NMR (300 MHz): δ = 1.06 (t, J = 7.3 Hz, 3H, CH₃), 1.87 (m, 2H, ArCH₂CH₂), 2.45 (q, J = 7.3 Hz, 2H, CH₂CH₃), 2.49 (t, J = 6.8 Hz, 2H, ArCH₂), 2.79 (m, 2H, CH₂CH₂CO), 6.68 (dd, J = 15.8, 7.7 Hz, 1H, ArCH=CH), 7.22-7.30 (m, 2H), 7.36 ("t", " J " = 7.4 Hz, 1H), 7.94 (d, J = 15.7 Hz, 1

H, ArCH=CH), 9.80 (d, $J = 7.7$ Hz, 1 H, CHO). ^{13}C NMR (75 MHz): δ = 7.84 (q, CH_3), 25.44 (t, ArCH_2CH_2), 32.60 (t, ArCH_2), 36.08 (t, CH_2CH_3), 41.19 (t, $\text{CH}_2\text{CH}_2\text{CO}$), 126.91 (d), 126.95 (d), 129.89 (d), 130.35 (d), 131.06 (d), 132.56 (s), 141.92 (s), 150.07 (d, ArCH=CH), 194.07 (d, CHO), 210.88 (s, COCH_2CH_3).