Electronic Supplementary Material (ESI) for Analyst
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Table S1: Lipid species found in rodent brain. All species are presented as identified by the respective authors.

m/z	Lipid ion species	Mouse	Rat
934.8	ST(44:0-OH) - H		[129]
932.8	ST(44:1-OH) - H		[128,129]
932.93	ST(44:2-OH) - H		[128]
908.8	ST(42:0-OH) - H		[129]
906.7	ST(42:1-OH) - H		[128,129]
904.7	ST(42:2-OH) - H		[128,129]
902.7	ST(42:3-OH) - H		[128,129]
878.7	ST(40:1-OH) - H		[128,129]
876.8	ST(40:2-OH) - H		[128,129]
850.82	ST(38:1-OH) - H		[128]
916.7	ST(44:2) - H		[128,129]
918.8	ST(44:1) - H		[128,129]
920.6	ST(44:0) - H		[129]
890.7	ST(42:1) - H		[128,129]
888.7	ST(42:2) - H		[128,129]
862.7	ST(40:1) - H		[128,129]
860.6	ST(40:2) - H		[128,129]
868.4	ST(38:4) + K		[129]
834.82	ST(38:1) - H		[128]
806.79	ST(36:1) - H		[128]
806.6	ST(34:0) - H		[129]
932.5	ST(18:1/26:1-OH) - H	[124]	[123]
916.5	ST(18:1/26:1) - H	[93,124]	
934.5	ST(18:1/26:0-OH) - H	[124]	[123]
918.5	ST(18:1/26:0) - H	[124]	
902.65	ST(18:1/25:1) - H	[93]	
904.65	ST(18:1/24:1-OH) - H	[42,53,72,124,180]	[26,52,123,164]
888.8	ST(18:1/24:1) - H	[37,42,53,83,93,124,130, 179,244]	[26,31,52,123,126,164,18 1]
906.67	ST(18:1/24:0-OH) - H	[93,124,180]	[26,52,123,164,170,177,1 81]
890.66	ST(18:1/24:0) - H	[53,93,124,130,180]	[26,52,123,126,164,177,1 81]
874.61	ST(18:1/23:1) - H	[93]	
876.62	ST(18:1/23:0) - H	[93]	
860.59	ST(18:1/22:1) - H	[93]	[123]
878.64	ST(18:1/22:0-OH) - H	[53,124,130,180]	[26,52,123,164]
862.65	ST(18:1/22:0) - H	[93,124,180]	[52,123,164]
850.62	ST(18:1/20:0-OH) - H	[93,124,180]	[123,129]
834.61	ST(18:1/20:0) - H	[42,124,180]	[26,52]
804.53	ST(18:1/18:1) - H	[93]	
822.59	ST(18:1/18:0-OH) - H	[93,124,130,180]	[26,123]

806.59	ST(18:1/18:0) - H	[42,93,124,180]	[26,52,164]
778.51	ST(18:1/16:0) - H	[93]	
904.62	ST(18:0/24:1-OH) - H	[93]	
878.60	ST(18:0/22:0-OH) - H	[93]	
851.6	SM(d18:1/24:1) + K	[85]	
835.65	SM(d18:1/24:1) + Na	[125]	
813.67	SM(d18:1/24:1) + H	[67]	[122]
815.68	SM(d18:1/24:0) + H		[122]
799.66	SM(d18:1/23:1) + H		[122]
801.67	SM(d18:1/23:0) + H		[122]
785.64	SM(d18:1/22:1) + H		[122]
787.66	SM(d18:1/22:0) + H		[122]
759.62	SM(d18:1/20:0) + H	[67]	[122]
729.59	SM(d18:1/18:1) + H	[67]	
769.54	SM(d18:1/18:0) + K	[125,175]	[52]
731.6	SM(d18:1/18:0) + H	[39,175]	[122]
753.5	SM(d18:1/18:0) + Na	[175]	
741	SM(d18:1/16:0) + K	[39,175]	
703.58	SM(d18:1/16:0) + H	[67]	[122]
769.6	SM(d18:0/18:1) + K	[85]	
731.5	SM(d18:0/18:1) + H	[39]	[47]
733.61	SM(d18:0/18:0) + H	[67]	
801.7	SM(41:1) + H	[130]	
753.59	SM(38:4) + H		[128]
775.70	SM(38:4) + H		[128]
769.56	SM(36:1) + K	[67]	
753.59	SM(36:1) + Na	[67]	[128]
731.2	SM(36:1) + H	[67,130]	[129]
725.8	SM(32:0) + Na		[129]
731.3	SM(36:0) + H		[129]
753.9	SM(36:0) + Na		[129]
769.3	SM(36:0) + K		[111,129]
751.9	SM(36:2) + Na		[129]
779.4	SM(38:2) + Na		[129]
851.8	SM(48:2) + K		[129]
834.5	PS(40:6) - H	[42,53,130]	[26,31,52,129,170,181]
868.48	PS(39:2) + K		[128]
806.4	PS(38:6) - H	[42]	[26]
810.67	PS(38:4) - H		[121,129,148]
852.48	PS(38:3) + K		[128]
784.1	PS(36:3) - H		[129]
786.2	PS(36:2) - H	[130]	[26,129]
788.5	PS(36:1) - H		[129,170,181]
850.7	PS(36:1) + K		[129]
790.6	PS(36:0) - H		[26,129]
754.4	PS(34:4) - H	[130]	

760.55	PS(34:2) + H		[128]
762.3	PS(34:0) + H		[26]
862.3	PS(22:2/20:4) - H		[177]
832.51	PS(18:1/22:6) - H	[93]	
834.4	PS(18:0/22:6) - H	[83,93,244]	[31,123]
838.56	PS(18:0/22:4) - H	[93]	
810.53	PS(18:0/20:4) - H	[93]	[123]
852.48	PS(18:0/20:3) + K	[125]	
812.54	PS(18:0/20:3) - H	[93]	
816.58	PS(18:0/20:1) - H	[93]	
786.53	PS(18:1/18:1) - H	[93]	[123]
788.55	PS(18:0/18:1) - H	[93]	[123]
762.6	PS(18:0/16:0) - H		[123]
806.4	PS(16:0/22:6) - H	[83]	
760.51	PS(16:0/18:1) - H	[93]	
762.53	PS(16:0/18:0) - H	[93]	
650.40	PS(16:0/10:0) - H	[93]	
648.39	PS(12:0/14:1) - H	[93]	
774.6	PS(P-18:0/18:0) - H		[123]
774.6	PS(O-18:0/18:0) - H		[123]
1045.87	PIP2(18:0/20:4) - H	[93]	
965.52	PIP(18:0/20:4) - H	[93]	[123]
935.5	PIP(16:1/20:4) - H		[123]
965.63	PIP(38:4) - H	[130,180]	
883.6	PI(38:5) - H		[129,181]
885.61	PI(38:4) - H	[42,53,130,180]	[26,52,126,128,129,181]
887.7	PI(38:3) - H		[129]
889.7	PI(38:2) - H		[129]
891.7	PI(38:1) - H		[129]
893.6	PI(38:0) - H		[129]
857.58	PI(36:4) - H	[42,130,180]	[26,52,128,129]
861.7	PI(36:2) - H		[129]
863.8	PI(36:1) - H		[129]
865.7	PI(36:0) - H		[129]
837.6	PI(34:0) - H		[129]
835.6	PI(34:1) - H		[129]
807.6	PI(32:1) - H		[129]
781.5	PI(30:0) - H		[129]
883.53	PI(18:1/20:4) - H	[93]	[123]
909.5	PI(18:0/22:6) - H	[83,93]	
885.5	PI(18:0/20:4) - H	[72,93,179]	[123]
599.32	lyso-PI(18:0) - H	[93]	
881.52	PI(16:0/22:6) - H	[93]	
857.52	PI(16:0/20:4) - H	[93]	[123]
821.56	PI(O-16:0/18:1) - H	[93]	
795.54	PI(O-16:0/16:0) - H	[93]	

781.49	PI(14:0/16:0) - H	[93]	
821.7	PG(40:6)		[123,129]
775.5	PG(36:1)		[129]
747.5	PG(34:1)	[42,130]	[129]
719.1	PG(32:1)		[129]
816.7	PE(42:8) + H		[47]
772.32	PE(38:1) + H		[121]
792.56	PE(40:6) + H		[78]
790.5	PE(40:6) - H	[130]	[26]
794.6	PE(40:4) - H		[129]
792.6	PE(40:5) - H		[129]
766.2	PE(38:4) - H	[130]	[129]
768.55	PE(38:4) + H		[78]
844.50	PE(38:4) +2K - H		[126]
812.6	PE(38:4) +2Na - H		[47]
806.5	PE(38:4) +K		[47]
762.5	PE(38:6) - H	[130]	[26,129]
806.5	PE(38:1) + K		[47]
834.6	PE(38:1) + K + Na - H		[47]
744.6	PE(36:1) - H		[129]
748.6	PE(36:0) + H	[175]	
742.1	PE(36:2) - H	[130]	[129]
722.6	PE(34:6) - H		[129]
716.7	PE(34:1) - H		[129]
718.6	PE(34:1) + H		[128]
700.56	PE(P-34:1) - H	[130]	[129]
726.7	PE(P-36:2) - H		[129]
728.6	PE(P-36:1) - H		[129]
746.5	PE(P-38:6) - H		[129]
750.5	PE(P-38:4) - H		[129]
754.6	PE(P-38:2) - H		[129]
756.1	PE(P-38:1) - H		[129]
774.7	PE(P-40:7) - H		[129]
776.6	PE(P-40:6) - H	[130]	[129]
778.6	PE(P-40:5) - H		[129]
710.8	PE(P-32:0) + K		[129]
716.6	PE(18:1/16:0) - H		[123]
790.54	PE(18:0/22:6) - H	[93]	
766.54	PE(18:0/20:4) - H	[93]	
744.56	PE(18:0/18:1) - H	[93]	[123]
716.6	PE(18:0/16:1) - H		[123]
762.51	PE(16:0/22:6) - H	[83,93]	
772.59	PE(16:0/22:1) - H	[93]	
744.6	PE(16:0/20:1) - H		[123]
748.53	PE(O-16:0/22:6) - H	[93]	
728.6	PE(P-20:1/16:0) - H		[123]

726.6	PE(P-18:1/18:1) - H		[123]
700.6	PE(P-18:1/16:0) - H		[123]
774.54	PE(P-18:0/22:6) - H	[93]	[123]
750.55	PE(P-18:0/20:4) - H	[93]	
728.6	PE(P-18:0/18:1) - H		[123]
746.51	PE(P-16:0/22:6) - H	[93]	
728.6	PE(P-16:0/20:1) - H		[123]
700.6	PE(P-16:0/18:1) - H		[123]
790.63	PC(P-38:6) + H		[122]
870.7	PC(42:2) + H		[31]
832.7	PC(40:7) + H	[130]	[31]
966.55	PC(40:6) + Cs		[167]
872.56	PC(40:6) + K	[39,140]	[167]
834.7	PC(40:6) + H	[130]	[78,129]
836.6	PC(40:5) + H		[129]
838.6	PC(40:4) + H		[129]
938.52	PC(38:6) + Cs		[167]
812.6	PC(38:6) + Li		[47]
844.53	PC(38:6) + K	[39,140]	[52,126,127,129,167]
806.57	PC(38:6) + H	[130]	[47,78,128,167]
942.56	PC(38:4) + Cs		[167]
832.7	PC(38:4) + Na		[129]
848.5	PC(38:4) + K		[129,139,167]
810.7	PC(38:4) + H	[130]	[78,111,122,128,167]
850.6	PC(38:3) + K	[85]	
812.6	PC(38:3) + H		[47]
816.6	PC(38:1) + H	[130]	[122]
792.56	PC(37:6) + H		[78]
780.7	PC(36:5) + H		[31]
914.55	PC(36:4) + Cs		[167]
820.53	PC(36:4) + K	[39,92,140]	[52,129,167]
782.57	PC(36:4) + H	[130]	[52,78,128,156,167]
806.7	PC(36:3) + Na		[128,129,167]
822.4	PC(36:3) + K		[129]
784.60	PC(36:3) + H		[167][122]
824.8	PC(36:2) + K		[129]
786.60	PC(36:2) + H		[78]
920.59	PC(36:1) + Cs		[167]
848	PC(36:1) + Na + K		[139]
826.57	PC(36:1) + K	[39,53,140,175]	[52,111,127,129,167]
810.7	PC(36:1) + Na	[175]	[111,126,128,129,156,167]
788.65	PC(36:1) + H	[180]	[78,111,128,129,167,189]
790.63	PC(36:0) + H		[122]
768.55	PC(35:4) + H		[78]
770.5	PC(35:3) + H	[130]	

756.53	PC(34:3) + H		[122,128]
866.47	PC(34:1) + Cs		[167]
798.54	PC(34:1) + K	[39,53,140,143,175]	[52,111,127,129,139,156,167]
782.3	PC(34:1) + Na	[175]	[111,126,128,129,156,167]
739.5	PC(34:1) + K - $N(CH_3)_3$	[175]	
766.6	PC(34:1) + Li		[47]
760.63	PC(34:1) + H	[130,175,180]	[47,52,78,111,128,129,156,167,189]
762.5	PC(34:0) + H		[129,189]
1523.3	PC(34:0) x2 + H		[129]
784.8	PC(34:0) + Na		[129]
800.56	PC(34:0) + K	[39,140]	
768.6	PC(34:0) + Li		[47]
746.6	PC(33:1) + H	[130]	[122]
866.47	PC(32:0) + Cs		[167]
772	PC(32:0) + K	[39,53,92,143,175]	[52,111,139,167,189]
756	PC(32:0) + Na	[175]	[52,126,128,167]
734.61	PC(32:0) + H	[130,175,180]	[31,47,78,111,121,128,129,156,167,189]
740.6	PC(32:0) + Li		[47]
1468.9	PC(32:0) x2 + H		[129]
732.3	PC(32:1) + H		[129]
718.6	PC(31:1) + H		[128]
706.03	PC(30:0) + H		[129]
736.2	PC(28:0) + H		[129]
1471.9	PC(28:0) x2 + K		[129]
616.4	PC(24:3) + H		[129]
868.6	PC(18:2/22:6) + K	[85]	
870.5	PC(18:1/22:6) + K	[85,114,125]	[112]
854	PC(18:1/22:6) + Na		[112]
832	PC(18:1/22:6) + H		[112,122]
846.51	PC(18:1/20:4) + K	[85,114,125]	[112]
830	PC(18:1/20:4) + Na		[112]
808	PC(18:1/20:4) + H		[112]
784	PC(18:1/18:2) + H		[112]
806	PC(18:1/18:2) + Na		[112]
822	PC(18:1/18:2) + K	[202]	[112]
826.6	PC(18:1/18:1) + K	[85,142]	[112]
808	PC(18:1/18:1) + Na		[112]
786	PC(18:1/18:1) + H		[112,122]
856.55	PC(18:0/22:6) + Na	[125]	[112]
872.54	PC(18:0/22:6) + K	[85,114,125]	[112]
834.56	PC(18:0/22:6) + H	[125,142]	[112,122]
832.54	PC(18:0/20:4) + Na	[125]	[112]

848.53	PC(18:0/20:4) + K	[85,114,125]	[112]
810	PC(18:0/20:4) + H		[112]
814.67	PC(18:0/20:2) + H		[122]
824.53	PC(18:0/18:2) + K	[125]	[112]
808	PC(18:0/18:2) + Na		[112]
786	PC(18:0/18:2) + H		[112]
810.56	PC(18:0/18:1) + Na	[125]	[112,136,162]
826.52	PC(18:0/18:1) + K	[72,85,114,125]	[112,162]
788.57	PC(18:0/18:1) + H	[125]	[112,122,162]
804.67	PC(16:1/22:6) + H		[122]
844.49	PC(16:0/22:6) + K	[85,114,125]	[112]
828	PC(16:0/22:6) + Na		[112]
806.56	PC(16:0/22:6) + H	[125]	[112,122]
804.53	PC(16:0/20:4) + Na	[125]	[112]
820.49	PC(16:0/20:4) + K	[85,114,125]	[112]
782	PC(16:0/20:4) + H		[112,122]
822	PC(16:0/20:3) + K	[85]	[112]
806	PC(16:0/20:3) + Na		[112]
784	PC(16:0/20:3) + H		[112]
824.50	PC(16:0/20:2) + K	[202]	
794.46	PC(16:0/18:3) + K	[202]	
796.49	PC(16:0/18:2) + K	[202]	
758.58	PC(16:0/18:2) + H		[122]
782.53	PC(16:0/18:1) + Na	[125]	[40,112,162]
798.51	PC(16:0/18:1) + K	[85,114,125,202]	[40,112,162,166]
760.6	PC(16:0/18:1) + H	[125,142,202]	[40,112,122,162,166]
800.52	PC(16:0/18:0) + K	[85,125]	[112]
784	PC(16:0/18:0) + Na		[112]
762	PC(16:0/18:0) + H		[112,122]
770.54	PC(16:0/16:1) + K	[85,125,202]	[112]
754	PC(16:0/16:1) + Na		[112]
732	PC(16:0/16:1) + H	[202]	[112,122]
756.5	PC(16:0/16:0) + Na	[125]	[40,112,162]
772.5	PC(16:0/16:0) + K	[85,114,125,179,202]	[40,112,162]
734.52	PC(16:0/16:0) + H	[122,125,202]	[40,112,122,162]
648.46	PC(10:0/16:0) - H	[93]	
670.6	PA(34:2) - H		[129]
673.5	PA(34:1) - H		[129]
699.6	PA(36:2) - H		[129]
735.3	PA(36:4) + K		[129]
1470.9	PA(36:4) x2 + K		[129]
699.50	PA(18:1/18:1)	[93]	[123]
747.50	PA(18:0/22:6)	[93]	
701.5	PA(18:0/18:1)		[123]
673.48	PA(16:0/18:1)	[93]	
715.57	PA(O-20:0/18:1)	[93]	

1818.6	GT3(d20:1/20:0) - H	[49]	
1818.6	GT3(d18:1/22:0) - H	[49]	
2196.8	GT1(O-acetyl)(d20:1/18:0) - H	[49]	[119]
2168.7	GT1(O-acetyl)(d18:1/18:0) - H	[49]	[119]
2214	GT1(d20:1/18:0) + Na + K - 3H	[118]	
2198	GT1(d20:1/18:0) + 2Na - 3H	[118]	
2176	GT1(d20:1/18:0) + Na - 2H	[169]	
2193	GT1(d20:1/18:0) + K - 2H	[169]	
2230	GT1(d20:1/18:0) + 2K - 3H	[118]	
2154.8	GT1(d20:1/18:0) - H	[49]	[119]
2186	GT1(d18:1/18:0) + Na + K - 3H	[118]	
2170	GT1(d18:1/18:0) + 2Na - 3H	[118]	
2149	GT1(d18:1/18:0) + Na - 2H	[169]	
2165	GT1(d18:1/18:0) + K - 2H	[169]	
2202	GT1(d18:1/18:0) + 2K - 3H	[118]	
2108.9	GT1(d18:1/18:0) - H_2O - H	[49]	[119]
2130.8	GT1(d18:1/18:0) + Na - H_2O - 2H		[119]
2126.7	GT1(d18:1/18:0) - H	[49]	[119]
2200.53	GT1(d18:1/20:0) - H	[48]	
2487.9	GQ1(O-acetyl)(d20:1/18:0) - H	[49]	[119]
2459.8	GQ1(O-acetyl)(d18:1/18:0) - H	[49]	[119]
2445.8	GQ1(d20:1/18:0) - H	[49]	[119]
2417.8	GQ1(d18:1/18:0) - H	[49]	[119]
2529.8	GQ1(2O-acetyl)(d20:1/18:0) - H	[49]	[119]
2501.8	GQ1(2O-acetyl)(d18:1/18:0) - H	[49]	[119]
1207.6	GM3(d18:1/C20:0) - H	[124]	
1179.6	GM3(d18:1/C18:0) - H	[49][124]	[119]
1201.5	GM3(d18:1/C18:0) + Na - 2H		[119]
1410.6	GM2(d18:1/C20:0) - H	[124]	
1383	GM2(d18:1/C18:0) - H	[49,53,124]	[119]
1364.4	GM2(d18:1/C18:0) – H_2O - H		[119]
1544.8	GM1(36:1) - H		[129][128]
1572.9	GM1(38:1) - H		[129][128]
1572.7	GM1(d18:0/20:1) - H	[42,49,118]	[119]
1572.6	GM1(d18:1/20:0) - H	[42,48,124,169]	
1542.87	GM1(d18:1/18:1) - H	[42,93]	
1544.7	GM1(d18:1/18:0) - H	[42,48,49,93,118,124,130,169]	[119]
1498.6	GD3(d18:1/20:0) - H	[124]	[119]
1470.7	GD3(d18:1/18:0) - H	[49,124]	[119]
1673.7	GD2(d18:1/18:0) - H	[49]	[119]
1655.4	GD2(d18:1/18:0) - H_2O - H		[119]
1905.7	GD1(O-acetyl)(d20:1/18:0) - H	[49]	[119]
1877.7	GD1(O-acetyl)(d18:1/18:0) - H	[49]	[119]
1886	GD1(d20:1/18:0) + Na - 2H	[49,118,169]	
1902	GD1(d20:1/18:0) + K - 2H	[118,169]	

1863.7	GD1(d20:1/18:0) - H	[49]	[119]
1858	GD1(d18:1/18:0) + Na - 2H	[48,49,118,124,169]	[119]
1874	GD1(d18:1/18:0) + K - 2H	[48,118,169]	[170]
1837.5	GD1(d18:1/18:0) - H	[49]	[119]
1817.8	GD1(d18:1/18:0) - H_2O - H		[119]
1885.6	GD1(18:1/20:0) - Na -2H	[48,124]	
848.64	GlcCer(d18:1/24:1) + K	[67]	
832.66	GlcCer(d18:1/24:1) + Na	[67]	
810.68	GlcCer(d18:1/24:1) + H	[67]	
808.67	GlcCer(d18:1/22:0) + K	[67]	
850.66	GlcCer(42:1) + K	[67]	
834.68	GlcCer(42:1) + Na	[67]	
766.56	GlcCer(34:1) + K	[67]	
830.7	GalCer(d18:1/24:2) + Na	[175]	
864.6	GalCer(d18:1/24:1-OH) + K	[125]	[127]
848.67	GalCer(d18:1/24:1-OH) + Na	[175]	[98,127,163]
832.67	GalCer(d18:1/24:1) + Na		[98,163]
816.7	GalCer(d18:1/24:1) + Li		[47]
850.62	GalCer(d18:1/24:0) + K	[125]	
835	GalCer(d18:1/24:0) + Na		[98,163]
837	GalCer(d18:1/23:0) + Na		[163]
850.68	GalCer(d18:1/24:0-OH) + Na		[98,126,127,163]
866.8	GalCer(d18:1/24:0-OH) + K		[127]
834.7	GalCer(d18:1/24:0-OH) + Li		[47]
822.59	GalCer(d18:1/22:0) + K	[125]	
822	GalCer(d18:1/22:0-OH) + Na		[126,163]
751	GalCer(d18:1/18:0) + Na		[98]
866.8	GalCer(48:0-OH) + K		[129]
722.5	GalCer(32:0) + Na		[129]
1132	GA2(d18:1/C18:0) + K	[53]	
303	FA(20:4) - H	[72]	[181]
225	FA(14:1) - H		[148]
281	FA(18:1) - H	[83]	[164,181,188,313]
283.5	FA(18:0) - H	[20,72,244]	[31,188,313]
255	FA(16:0) - H	[20]	[164,188,313]
327.4	FA(22:6) - H	[83]	[181]
1469.97	CL(72:8) + Na -2H		[42]
1471.98	CL(72:7) + Na -2H		[42]
1474.00	CL(72:6) + Na -2H		[42]
1476.01	CL(72:5) + Na -2H		[42]
1495.98	CL(74:9) + Na -2H		[42]
1498.00	CL(74:8) + Na -2H		[42]
1500.01	CL(74:7) + Na -2H		[42]
1519.98	CL(76:11) + Na -2H		[42]
1522.00	CL(76:10) + Na -2H		[42]
1524.01	CL(76:9) + Na -2H		[42]

644.6	CerP(d18:1/18:0) - H	[93,130]	
648.63	Cer(d18:0/24:1) + H	[67]	
548.5	Cer(d18:0/18:1) - H_2O + H		[40]
520.5	Cer(d18:0/16:1) - H_2O + H		[40]
518.5	Cer(d18:0/16:0) - H_2O + H		[40]
604.51	Cer(36:1)) + K	[67]	
383	Chol $(M-H-H_2)^+$	[20]	
385.36	Chol $(M-H)^+$	[20,180]	[31,98,163,164]
385.35	Chol $(M-H)^-$	[20,180]	
369.37	Chol $(M+H-H_2O)^+$	[20,180]	[78,98,112,156,163,164,176]
753.74	Chol $(2M-H_3O)^+$	[180]	
771.74	Chol $(2M-H)^-$	[180]	
429.3	Vit E - H		[31]

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Table S2: Comprehensive overview of published works on imaging of lipids.

Tissue/sample	Type of oganism	Imaging technique	Identified lipid species	Main aim of the study	Ref.
Langmuir-Blodgett film	–	TOF-SIMS	POPG, DPPC	PCA of TOF-SIMS images of lipid monolayers (Langmuir-Blodgett film)	[10]
Langmuir-Blodgett film	–	TOF-SIMS	DPPC, DPPE, DPDE, Chol	Study of lipid raft formation.	[18]
Brain	Mouse	TOF-SIMS	Chol, TCP, FAs, TAGs	Demonstration of imaging capabilities of a Bi_n^+-cluster primary ion gun.	[19]
Brain	Mouse	TOF-SIMS	Chol, PL-fragments	Demonstration of imaging capabilities of a Ag_n^+-cluster primary ion gun.	[20]
Lipid vesicles and bilayers	–	TOF-SIMS	PC-fragments	Investigation of spatial resolution limits of TOF-SIMS using lipid vesicles and supported lipid bilayers. Comparison of C_{60}^+ and Bi_n^+ primary ions.	[22]
Oocytes (stage IV-VI)	Xenopus laevis	dTOF-SIMS	PCGH, Chol, FAs	Subcellular imaging in three dimensions with a C^+_{60} primary ion.	[23]
Ganglia	Freshwater snail	TOF-SIMS	DAG, Chol, PC-fragment	Application of matrix enhanced SIMS for subcellular imaging of lipids.	[25]
Brain	Rat	TOF-SIMS	PEs, PSs, STs, PIs, PG	Introduction of higher order gold clusters as primary ion beam for increased molecular lipid signals.	[26]
Kidney	Rat	dTOF-SIMS	PCHG, Chol	Demonstration of imaging results acquired with C^+_{60} primary ions on instrument modified for decoupled MS analysis and sputtering event.	[29]
Brain	Rat	TOF-SIMS HV-MALDI-TOF	PCs, STs, PEs Chol, FAs	Comparison of MALDI and TOF-SIMS.	[31]
Leaf, stem, flower	*A. thaliana* (Ler-0) *A. thaliana* (CS31)	IP-MALDI-LIT IP-MALDI-Orbitrap	FAs, alkanes, alcohols, ketones, aldehydes	Imaging of fatty acids and lipid metabolites on an Arabidopsis WT and mutant strain employing colloidal silver as matrix.	[35]
Brain	Mouse	LSI-LIT	ST	First imaging experiment using transmission geometry and laser spray ionization (LSI).	[37]
Brain	Mouse	HV-MALDI-TOF/TOF	PCs	Presentation of dry coating matrix deposition approach and comparison with spray coated samples.	[39]
Brain (with TBI))	Rat (Sprague-Dawley)	IP-MALDI-QTOF	PCs, Cers	Imaging of brains after transient ischemia and fluid percussion injury.	[40]
Brain	Rat (Sprague-Dawley)	HV-MALDI-TOF/TOF	STs, CLs	Tissue treatment with phospholipase to enable imaging of cardiolipins. Comparison with LC-MS and MALDI-MS	[42]
Brain	Rat (Sprague-	HV-MALDI-	PSs, PIs, PGs, CLs	Imaging of unilaterally impacted brain tissue for decreased levels	[42]

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	Dawley)	TOF/TOF		of PUFAs as indirect marker of lipid peroxidation.	
Lung	Mouse	HV-MALDI-TOF/TOF	CLs, PCs	Imaging of oxidatively truncated CLs as marker of acute lung injury.	[42]
Lens	Porc	HV-MALDI-FTICR	SMs, CerPs	Imaging of sphingolipids in porcine lens.	[44]
Retina	Mouse (C57BL/6)	IP-MALDI-QIT-TOF	PCs	Study of zonal distribution of PC species in mouse retinal sections	[45]
Kidney	Mouse (C57BL/6) Mouse (C57BL/6, $ASA^{-/-}$)	HV-MALDI-TOF/TOF	STs	Analysis of presence and specific distribution of sphingadienine containing sulfatides in kidney from mice with lysosomal storage disease.	[46]
Brain	Rat (Wistar)	HV-MALDI-TOF/TOF	PCs, PEs, GalCers	Assessing the suitability of different lithium salts for spectral simplification via complete adduct formation.	[47]
Brain	Mouse (CD-1)	HV-MALDI-TOF/TOF	Gangliosides	Development of an optimized liquid ionic matrix for ganglioside imaging.	[48]
Brain	Mouse (C57BL/6)	HV-MALDI-TOF/TOF	GM1, GD1 GT1, GQ1	Development of a matrix preparation based on DHA for ganglioside mapping and comparisons to DHB matrix.	[49]
Liver (colon cancer metastasis)	Human	HV-MALDI-TOF/TOF	PLs, SM, PC	Comparison of differential distributions of lipids in cancerous and adjacent healthy tissue for one patient.	[51]
Brain	Rat (Sprague-Dawley)	HV-MALDI-TOF/TOF	PCs, SMs, STs, PS, PI	Comparison of TLC sprayers, collison nebulizer and artistic airbrush for matrix deposition. Discussion of discrepancies to TOF-SIMS data.	[52]
Brain	Mouse (B6;129S-Hexbtm1Rlp) $hexb^{+/-}$ and $hexb^{-/-}$	HV-MALDI-TOF	PCs, STs, PlsEtn, PI, PS, GM2	Comparison of matrix deposition with OCN and TLC sprayer and application to mouse model of Tay-Sachs/Sandhoff disease.	[53]
Brain	Rat (Wistar)	IP-MALDI-QTOF	not specified	Introduction of a 20 kHz laser for fast image acquisition.	[58]
Brain	Rat	HV-MALDI-TOF	PCs	Presentation of a high repetition rate laser for fast image acquisition.	[59]
Brain	Mouse	DESI-FTICR APPI-FTICR	SMs, GalCers, PCs	Presentation of a platform for adaptation of atmospheric pressure ion sources to an FTICR instrument.	[67]
Leaf	Phyllanthus urinaria	HV-MALDI-DP-TOF	Secondary lipid metabolites	Presentation of dual polarity TOF MS, capable of positive and negative spectral acquisition at the same time.	[71]
Brain	Mouse (C57BL/6)	IP-MALDI-QIT-TOF	PCs, PI, ST	Introduction of new QIT-TOF instrument.	[72]
Leaf	Zebra plant	LAESI-QTOF	DAGs, TAGs	Imaging of secondary metabolites and demonstration of depth profiling capabilities. Lipids only tentatively assigned.	[75]
Brain	Rat (Sprague-Dawley)	LAESI-QTOF	PCs, PEs, Chol, plasmenylPC and PE	Presentation of technical and methodological developmentsfor application of LAESI MS imaging of rat brain sections.	[78]
Whole Body	Bumblebee	HV-MALDI-	Not specified	Demonstration of a MALDI compatible embedding medium.	[81]

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		TOF/TOF			
Brain	Cancer borealis	HV-MALDI-TOF/TOF	PCs, SMs	3D-imaging of neuropeptides and lipids in crustacean brain.	[82]
Brain	Mouse	DESI-LIT	PIs, STs, PSs, PG, plasmenyl-PEs	3D-images out of 36 serial mouse brain sections (embedded in CMC, 20 µm thick)	[83]
Lung	Mouse (C57BL/6)	IP-MALDI-QTOF	SMs, PCs, PGs,	Development of a MALDI-MSI compatible embedding medium for delicate tissue. Imaging of PUFA containing PLs in pulmonary tract.	[84]
Egg Chamber	Drosophila (w^{1118}; p{ubi-nls-GFP})	HV-MALDI-TOF	PIs	Introduction of laser ablated sample support for microscale samples and ultrasonic sprayer for matrix application. Imaging of algal cells for determination of spatial resolution. Application for imaging of lipids in egg chambers at various stages of oogenesis.	[90]
Spinal cord	Rat (Long-Evans)	TOF-SIMS HV-MALDI-TOF/TOF	PC, PS, PI fragments, TCP, Chol	Demonstration of imaging approach that combines SIMS and MALDI for analysis of rat spinal cord sections.	[91]
Brain (glioma)	Human	IP-MALDI-IM-TOF	Not identified	Illustration of an ethanol washing step on the outcome of peptide and lipid imaging.	[92]
Liver	Mouse	IP-MALDI-IM-TOF	PC	Imaging of nominally isobaric peptide and lipid species with the help of ion mobility.	[92]
Brain	Mouse	IP-MALDI-IM-TOF	PCs	Demonstration of ion mobility as additional separation step.	[92]
Brain	Mouse	HV-MALDI-TOF/TOF	FAs, PSs, STs, GM1,	Aqueous tissue washing step for enhanced lipid identification. Application for whole body and brain imaging.	[93]
Brain (Cerebellum)	Rat (Sprague-Dawley)	TOF-SIMS	GalCers, Chol	Visualization of sphingolipids at high and low resolution with plunge frozen and high pressure frozen samples.	[98]
Cells	P12 cells	TOF-SIMS	PE-, PC-, SM fragments	Presentation of a freeze fracture device for imaging of single cells.	[99]
Cells	Macrophages (J774), Glial Cells (Sprague-Dawley rat)	TOF-SIMS	PC, PE fragments	Presentation of trehalose-glycerol matrix to generate subcellular resolved ion images.	[100]
Brain (formalin-fixed)	Rat	MALDI-QqTOF	SMs, PCs	Investigation of the viability of MALDI-MSI for analysis of formalin fixed tissue and comparison with freshly prepared tissue sections.	[105]
Cells	Human (HeLa)	TOF-SIMS	Phosphocholine	Analysis of freeze fractured single cells for PCA assisted three dimensional visualization.	[106]
Cells	HeLa	AP-MALDI-Orbitrap	PCs, SMs, PSs, Chol, TAG	Imaging of single cells embedded in an imaging compatible fixation step,	[107]

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Brain	Mouse	DESI-LIT	GPs, FAs	Study of sample integrity for imaging (heat stress, freeze/thaw cycles).	[108]
Brain Liver	Rat (Sprague-Dawley)	HV-MALDI-TOF	DAGs,TAGs Glycerophospholipids SMs	Suitability assessment of 2-Mercaptobenzothiazole as a matrix for a wide variety of lipids, comparisons with DHB and PNA.	[111]
Brain	Rat (Wistar)	HV-MALDI-TOF/TOF	PCs, TAGs	Study of impact of matrix organic solvent concentration, type and concentration of salt modifiers for complete adduct formation on lipid detectability.	[112]
Retina	Salamander (*A. mexicanum*)	AP-MALDI-QIT-TOF	PCs, SMs, PEs, PSs, PIs	Imaging of lipid distribution in layered structures of salamander retina. Large cells and special instrumental design allowed single cell imaging.	[113]
Brain	Mouse (C57BL/6 Cr)	IP-MALDI-QTOF HV-MALDI-TOF/TOF	PCs, PEs, PSs, PIs, STs	Mapping and statistical analysis of lipids in mouse brain at different developmental stages with focus on polyunsaturated FA containing PCs.	[114]
Kidney	Mouse	HV-MALDI-TOF/TOF HV-MALDI-FTICR	PCs, PEs, SMs	Presentation of tissue imprints on nanostructured surface as alternative to traditional matrix coating techniques.	[115]
Brain	Mouse (C57BL/6 Cr)	HV-MALDI-TOF/TOF	GM1, GD1, GT1	Study of development and aging (0, 3, 14, 56, 231 postnatal weeks) related changes of ganglioside species. Additional MS experiments to evaluate degree of sialic acid loss of gangliosides.	[118]
Brain	Rat (Sprague-Dawley)	IP-MALDI-LIT	Gangliosides	Investigation of differential distribution of ganglioside species (including acetylated species) in rat brain cerebrum.	[119]
Brain	Rat	HV-MALDI-TOF/TOF	PE, PC, PS	Development of spotting strategy employing piezoelectric chemical inkjet printer for spotting micro-arrays of new solid ionic matrix.	[121]
Brain	Rat (Sprague-Dawley)	IP-MALDI-LIT	PCs, SMs	Introduction of a matrix consisting of DHA, ammonium sulfate and HFBA as a capable tool for imaging of PCs and SMs.	[122]
Brain	Rat (Wistar)	HV-MALDI-TOF/TOF	PAs, PEs, PSs; PIs, STs	Comparison of 9-AA with well-established matrices (CHCA, DHB, THAP) for detection of phospholipids and sulfatides.	[123]
Brain	Mouse (C57BL/6)	IP-MALDI-QTOF	STs, GM1, GM2, GM3, GD1, GD3	Application of alkylamine modified gold nanoparticles as new matrix for IMS to achieve higher spatial resolution and sensitivity.	[124]
Liver	Mouse	HV-MALDI-TOF/TOF	PCs, PIs, PSs, PE	Comparison of two liquid ionic matrices based on DHB and CHCA.	[125]
Brain (cerebellum)	Mouse	HV-MALDI-TOF/TOF	PCs, Cers, SMs, PS	Comparison of two liquid ionic matrices based on DHB and CHCA.	[125]
Brain	Rat (Sprague-Dawley)	HV-LDI-TOF IP-LDI-Orbitrap	GalCers, PCs, PEs	Comparison of graphite and DHB matrices at different ionization chamber pressures	[126]

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Brain	Rat (Sprague-Dawley)	IP-MALDI-IM-TOF	PCs, Cers	MALDi ion mobility imaging and comparison of DHB and gold nanoparticles as matrix.	[127]
Brain	Rat (Wistar)	HV-MALDI-TOF/TOF	PCs, SMs, STs, GM1	Demonstration of new vacuum stable and micro spotting compatible liquid ionic matrix.	[128]
Ovarian cancer	Human	HV-MALDI-TOF/TOF	PCs, lysoPCs, DAGs, ST, SMs	PCA and hierarchical cluster analysis of data acquired from cancerous and adjacent healthy tissue of patients suffering from ovarian cancer.	[128]
Brain	Rat	HV-MALDI-TOF/TOF	PCs, STs, ST-OHs, SMs	Development of binary matrix preparation for IMS in both ion modes to maximize PL identification.	[129]
Brain	Mouse	HV-MALDI-TOF/TOF	PCs, STs, PCs, PG, SMs, PEs, PA, GM1, Cer P	Investigation of well-established and new matrix substances for their suitability to be sublimated.	[130]
Liver	Rat	HV-MALDI-FTICR	PA, PC, PG,	Application of dithranol as matrix and comparison with CHCA and DHB.	[132]
Lens	Cattle	HV-MALDI-FTICR	SMs, PCs, PEs, PAs, acyl-carnitines, sterol-lipids, LacCers	Imaging of bovine lens with dithranol as matrix.	[132]
Cerebral ganglia	Lymnea Stagnalis (Fresh water pond snail)	TOF-SIMS HV-MALDI-TOF	Cholesterol	ME-SIMS for subcellular imaging and comparison with MALDI	[137]
Kidney, Liver	Rabbit	HV-MALDI-TOF/TOF	–	Combinatorial optimization of matrices with an industrial inkjet printer.	[138]
Brain	Rat	HV-MALDI-TOF/TOF	PCs	Repeatability and precision of a commercially available piezoelectric dispenser. Assessing of different experimental variables.	[139]
Brain Kidney	Mouse	LDI-FTICR	PCs	LDI-MS imaging of high-mass PCs from tissue sections	[140]
Brain	Mouse	IP-MALDI-QTOF	PCs	Investigation of sublimation as alternative matrix coating technique and comparison with electrospray deposition.	[142]
Brain	Mouse (C57BL/6)	HV-MALDI-TOF	PCs	Presentation of automated solvent free matrix deposition.	[143]
Wings, legs, plant parts	Grey flesh fly (*S. bullata*) Fruit fly (*D. melanogaster*) *Phonix sp.*, *A. thaliana*	HV-MALDI-TOF	HCs, WEs	Application of DHB alkali metal salts for imaging of neutral lipids and hydrocarbons from fruit fly body parts.	[144]
Flower and Leaves	*A. Thaliana* (Ler-0)	IP-MALDI-LIT	FAs, alkanes, alcohols, ketones,	Study of cuticular wax deposition on *A. Thalania* plant parts using colloidal silver matrix. Comparison of WT and mutant to get first	[146]

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	WT and mutant stock CS8		aldehydes	insights into CER2 gene function.	
Brain	Rat (Sprague-Dawley)	DESI-LIT	PS, FA	Demonstration of imaging capabilities of DESI.	[148]
Brain Kidney	Rat (Wistar) Human	nano-DESI-LIT-Orbitrap	PCs, Chol CholE	First application of nano-DESI to imaging of lipids in rat brain and human kidney tissue.	[156]
Kidney, Testis, Lung, Brain	Rat	DESI-LIT	PC	Utilization of ubiquitous PC signal to normalize signal intensity of administered drug.	[157]
Brain	Mouse (C57BL/6)	HILIC-HPLC-ESI-QqQ	Gangliosides, STs	Detection of lipid species in laser dissected sections.	[161]
Brain	Rat (Sprague-Dawley)	IP-MALDI-TOF/TOF	PCs	Comparison of relative responses of MALDI-IMS data with ESI spectra acquired from microdissected tissue.	[162]
Brain	Mouse (Balb/c)	HV-MALDI-TOF/TOF	PCs, SMs	NIMS of OCT embedded brain.	[85]
Brain	Rat (Sprague-Dawley)	TOF-SIMS	PC-fragments, GalCers, Chol	Localization of cholesterol and cerebrosides in the rat cerebellum	[163]
Brain (Cerebellum)	Rat (Sprague-Dawley)	TOF-SIMS	STs, FAs, Chol, Phosphocholine	Comparison of plunge-freezing and cryostat sectioning as well as high-pressure freezing, freeze-fracturing and freeze-drying as sample preparation techniques.	[164]
Intestine	Mouse (BALB/c)	TOF-SIMS	Chol	Study of cholera toxin impact on lipid composition in the intestinal epithelium.	[164]
Leucocytes	Human	TOF-SIMS	Chol, PC fragments	Silver deposition and PCA for subcellular localization of Chol using metal assisted SIMS.	[165]
Brain (with TBI))	Rat (Sprague-Dawley)	IP-MALDI-QTOF	lysoPCs, PCs	Study roles of LPCs in the progression of ischemic injury on rats with focal cerebral ischemia.	[166]
Brain	Rat (Sprague-Dawley)	IP-MALDI-QTOF	Lyso-PCs,	Study of characteristic locally confined changes following ischemic stroke.	[166]
Brain (ischemic)	Rat (Sprague-Dawley {Crl:CD [SD]})	HV-MALDI-TOF/TOF	PCs, lyso-PCs, SMs	Profiling of changes in PC and LPC species in cerebral cortex after ischemic stroke.	[167]
Brain	Human	HV-MALDI-TOF/TOF	PCs, SMs	Imaging of a brain from 70-year old patient suffering from schizophrenia to reveal abnormal lipid distribution.	[168]
Brain (ischemic)	Mouse (C57BL/6)	HV-MALDI-TOF/TOF	GM1, GM3, GD1, GD1a, GT1b	Imaging of gangliosides through time course of recovering from ischemic stroke.	[169]
Brain	Rat (PND 17)	MALDI	PSs, GD1, ST	Review about oxidative lipidomics with additional preliminary data.	[170]
Spinal cord (T10)	Rat	DESI-LIT	DGs, lysoPG,	Imaging of low molecular mass oxidative stress marker to better	[171]

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			lysoST, PGF	understand lipid biochemistry during spinal cord injury.	
Spinal cord	Rat	HV-MALDI-TOF/TOF	PCs	Study of lesion site specific changes of PUFA containing PCs as indirect markers of prostaglandin production in impacted tissue.	[172]
Spinal cord	Rat (Sprague-Dawley)	IP-MALDI-LIT-Orbitrap	PCs, Cers, PSs	Imaging of lipids in spinal cord combining MS/MS and HRMS capabilities.	[174]
Brain	Mouse (C57BL/6)	IP-MALDI-IM-QTOF	PCs, SMs, GalCers, PE	Combination of elemental LA-ICP-MS images and lipid images to study a model of Parkinson's disease.	[175]
Brain	Rat	TOF-SIMS	Chol	Consecutive TOF-SIMS and histological staining on one section.	[176]
Brain	Rat	HV-MALDI-TOF/TOF	STs	Use of nanoparticle based matrix for determination of sulfatides in hippocampal substructures.	[177]
Neuron Brain	Sea slug Mouse	dQTOF-SIMS IP-MALDI-QTOF	plasmenylPCs, PCs	Comparison of SIMS and MALDI for selected lipids.	[178]
Brain	Mouse	Not given	PCs	Brief introduction to MALDI tissue imaging.	[179]
Brain	Mouse	TOF-SIMS	STs, ST-OHs, Chol, PIs, PCs	Imaging and PCA of lipid species in mouse brain.	[180]
Brain	Rat	DESI-LIT	PSs, PIs, STs	Demonstration of DESI for tissue imaging.	[181]
Aortic root	Mouse (C57BL/6 ApoE)	HV-MALDI-TOF/TOF	PCs, CholE	Attempt to identify and visualize lipid markers for aortic atherosclerosis	[182]
Artery (femoral)	Human	HV-MALDI-TOF/TOF	PCs, TAG, CholE	Attempt to identify and visualize lipid markers for aortic atherosclerosis	[182]
Heart	Mouse	TOF-SIMS	Chol	SIMS images to complement LA-ICP-MS data of art	[183]
Aorta Carotid artery	Rat Human	TOF-SIMS	FAs, Chol, oxChol	Localization of lipids in rat aorta and human atherosclerotic plaque.	[184]
Intestine (Colon)	Mouse (C57BL/6) WT and Cftr-exon 10-knockout	TOF-SIMS	FA, TCP, Chol, Chol-SO4	Statistical discrimination of a knockout mouse model for cystic fibrosis with respect to a wild-type mice.	[185]
Brain (Cerebellum)	Rat (Sprague-Dawley)	TOF-SIMS	FAs, PC fragments	Demonstration of selective distribution pattern of fatty acid chain length at cellular resolution.	[188]
Intestine (Duodenum)	Mouse (Balb/c)	TOF-SIMS	FAs, PI fragments	Demonstration of selective distribution pattern of fatty acid chain length at cellular resolution.	[188]
Brain	Rat (Wistar)	IP-MALDI-QTOF	PCs	Supervised and unsupervised PCA of imaging data as supporting tool for spectral interpration.	[189]
Skeletal muscle	Mouse (C57BL/6) Mouse (C57BL/6 *ob/ob*)	TOF-SIMS	PIs, PCs, DAGs, TAGs, Chol, FA	PCA of two mouse groups for studying skeletal muscle lipid accumulation associated with obesity.	[190]
Adrenal gland Adipose tissue	Rat (Sprague-Dawley)	TOF-SIMS	DAGs, FAs, Steroids	PCA analysis of data acquired from transgenic and wild-type mice. Visualization of lipids in rat adrenal gland.	[192]

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	Mouse (FOXC2)				
Cells Muscle (dystrophic)	Myoblasts (*nxlt* and *xlt*) Mouse (C57BL mdx)	HV-MALDI-TOF	PCs	Identification of possible biomarkers using cell cultures and subsequent imaging of mouse leg for tissular changes related to Duchenne muscular dystrophy.	[193]
Muscle (dystrophic)	Human	TOF-SIMS	PCs, SMs, FAs, PIs, TAGs, Chol, TCP	Imaging of lipids in one control and two DMD affected patients.	[194]
Muscle (dystrophic)	Mouse (C57BL mdx)	TOF-SIMS	PCs, TCP, FAs, PAs, TAGs, Chol, PI fragments	Lipid imaging of mouse model of Duchenne muscular dystrophy.	[195]
Limb	Mouse (DBA/1)	IP-MALDI-IM-QTOF, TOF-SIMS	PCs	Application of MALDI and TOF-SIMS imaging for lipid, peptide and protein imaging to study pathology of rheumatoid arthritis	[196]
Retina	Mouse (C57BL/6)	HV-MALDI-TOF	FAs	Application of alkylcarboxylate and alkylamine derivatized silver nanoparticles as matrix for imaging of Fas in retinal sections.	[197]
Retina	Rat (Wistar)	TOF-SIMS	FAs	Imaging of fatty acids in retina sections of 4 and 18 months old rats.	[198]
Ear Muscle (leg)	Pig Rat (Wistar)	HV-MALDI-TOF/TOF	LTC4, LTD4	Imaging of LTs as response markers of inflammatory response to honey bee venom in the lapse of time.	[199]
Implantation site	Mouse (CD-1)	HV-MALDI-TOF HIV-MALDI-FTICR	PEs, PCs, PIs, PCs, Peps, LPI	Spatial and temporal investigation on lipid distribution within implantation sites.	[200]
Germ cells	Mouse (CD-1, female) (Oct4:ΔPE:GFP, male)	TOF-SIMS	Chol	Study of germ cell number and migration in mouse embryos as a function of cholesterol to clarify whether biosynthesis is required in PGCs themselves or if it can be supplied maternally.	[201]
Embryo (whole body)	Mouse (ICR)	IP-MALDI-QTOF	PCs, Lyso PCs, TAGs	Organ specific localization of lipids in whole body sections of 17. ???? days old embryos.	[202]
Testes	Mouse (C57BL/6)	HV-MALDI-TOF/TOF	Seminolipids	Study of cell specific distribution of seminolipids in different developmental states. Structural analysis using TLC-BLOT-MALDI-MS	[203]
Kidney	Mouse (Balb/c and HIGA)	IP-MALDI-QIT-TOF	PCs, TAGs	Imaging and HPLC-MS/MS to study molecular differences between HIGA and Balb/c mice.	[206]
Kidney	Mouse (Balb/c) Mouse (HIGA)	IP-MALDI-QTOF	PCs	Study of lipid changes specific to IgA nephropathy in a mouse model. Comparison of characteristic patterns with changes induced by artificial urinary stagnation	[206]
Tongue	Mouse (C57BL/6)	IP-MALDI-LIT	LPCs, PCs, SM	Visualization of specific lipids in mouse tongue body.	[207]
Brain	Human	HV-MALDI-TOF	PCs, PEs, SMs, STs	PCA and PLSA of MALDI imaging data in combination with autoradiography.	[208]

Brain	Human	HV-MALDI-TOF	PCs, PEs, SMs	Probabilistic latent semantic analysis of lipid species in human brain. Comparison of imaging results with data acquired from tissue extracts.	[209]
Kidney (Fabry diseased) Skin (Fabry diseased)	Human	TOF-SIMS HV-MALDI-TOF	asialo-GM2, GB3 Chol, CholSO4, TCP	Application of two IMS techniques to characterize gangliosides accumulation in cutaneous and renal biopsies obtained from Fabry disease patients.	[211]
Brain	Human	TOF-SIMS	PC-fragments, Chol, FAs	Biological study of Morbus Behcet	[212]
Brain	Human	HV-MALDI-TOF/TOF	STs	Mapping of sulfatide species in healthy and Alzheimer affected human brain.	[214]
Liver	Human	TOF-SIMS	MAGs, DAGs, TAGs, PCs, PIs, Fas, TCP, Chol	Study of lipid zonation in healthy and nonalcoholic steatotic liver.	[215]
Liver	Human	TOF-SIMS	PC, SM fragments, PC, PIs, TCP, Chol	Combinination of TOF-SIMS with synchrotron-FT-IR and synchrotron-UV microspectroscopies for multidimensional spectroscopic analysis.	[216]
Liver	Human	TOF-SIMS	Chol, DAGs	Study of liver steatosis on three healthy and three diseased patients.	[217]
Straticell-RHE-EPI-001	Reconstructed skin tissue model	HV-MALDI-TOF	PCs SMs	Feasability of drug absorption monitoring on a reconstructed skin model.	[218]
Brain	Rat (Sprague-Dawley)	IP-MALDI-LIT	PC	Customization of a desktop inkjet printer for matrix application, comparison with electrospray and airbrush coating	[218]
Skin	Human	IP-MALDI-QTOF	PCs, CerP, SMs, PE, LPC	MALDI-MSI of lipids in different skin layers.	[219]
Diverse (Myxofibrosarcoma)	Human	HV-MALDI-TOF/TOF	PCs, TAGs	Unsupervised PCA and supervised hierarchical cluster analysis to distinguish different types and different grades of myxoid soft tissue tumours.	[234]
Ovary (Tumor)	Human	HV-MALDI-TOF	STs	Combination of gene expression analysis and lipid images to reveal elevated levels of sulfatides in cancerous tissue.	[235]
Bladder	Dog	DESI-LIT	PSs, PIs, PG, PCs, FAs SM	PCA of cancerous and adjacent noncancerous dog bladder tissue of 4 dogs.	[236]
Bladder	Human	DESI-LIT	PCs, SM(34:1)	Statistical analysis of cancerous and adjacent healthy bladder tissue of 20 patients.	[237]
Bladder	Human	DESI-LIT	PS, PI, FAs	PCA and PLS-DA of 20 sample pairs comprised of cancerous and healthy tissue.	[238]
Kidney	Human	DESI-LIT	PSs,PIs,PG, FAs	PLS-DA of 11 matched pairs of papillary RCC and adjacent normal tissue and nine matched pairs of clear cell RCC and adjacent normal tissue.	[240]

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Prostate	Human	DESI-LIT	Chol, Chol-SO4	PCA of 34 patients to study Chol-SO4 in human prostate cancer and its role in malignancy.	[241]
Testis (germ cell tumor)	Human	DESI-LIT	PIs, PSs, Seminolipids	Tissue sections of 15 seminoma patients were imaged for differences with respect to adjacent healthy tissue.	[242]
Brain (Cerebrum)	Human	DESI-LIT	PSs, PIs, STs, PCs, GalCers plasmenyl-PEs,	Analysis of lipids in glioma for visualization of infiltrative tissue.	[243]
Brain	Mouse	HV-MALDI-TOF/TOF DESI-LIT	FAs, PIs, PSs, STs, PG	Investigation of successive imaging with DESI and MALDI on single tissue slice.	[244]
Lens	Human	IP-MALDI-QTOF	DHCers, DHSMs	Study of sphingolipids and their changes in lenses 31 and 73 years old	[247]
Lens	Human	DESI-LIT DESI-Orbitrap	Chol, PSs, PEs, SMs, CerPs, LPEs, LacCers	Sections from 52 and 75 year old patients	[248]
Lens	Porc	HV-MALDI-FTICR	lysoPCs, PCs, lysoPEs, PEs, PAs	Imaging of 30 lipids to reveal their spatial distributions as complementary information to UHPLC-MS/MS lipidome data.	[249]
Lens	Human	IP-MALDI-LIT	PCs, lysoPC, oPC	Imaging of lipids and contaminations stemming from preservation.	[250]
Vein (varicose)	Human	IP-MALDI-QTOF	PCs, lysoPC, SMs	Imaging of lipids to address possibility of involvement of lipid-triggered inflammation in formation of VV.	[251]
Carotid artery	Human	DESI-LIT	PCs, SMs, Chol, CholE	Visualization of lipids in arterial plaques.	[252]
Carotid artery	Human	TOF-SIMS	FAs, TCP, PAs, Chol, SM and PI fragments	Visualization of lipids in arterial plaques.	[253]
Adipose tissue	Human	TOF-SIMS	DAGs, TAGs, FAs, Chol	Study of lipid distribution in human adipose tissue.	[254]
Skeletal muscle	Human	TOF-SIMS	DAGs, TAG,	Imaging of lipids in human skeletal muscle.	[255]
Adipose tissue	Human	TOF-SIMS	TAGs, DAGs, FAs	Study of variations in the spatial and compositional distributions of lipids in adipose tissue of 6 humans suffering from chronic kidney disease	[256]
Intestine (colon carcinoma)	Human	IR/UV-LDI-LIT-Orbitrap	PLs	Demonstration of surgical CO_2 laser and UV laser for LDI-MS. Presentation of PCA LDA of data acquired from cancerous human tissue. Further examples: *ex vivo* porcine organs and *in vivo* dog organs.	[257]
Brain (Tumor)	Human	CUSA-V-EASI-LIT-Orbitrap	PlasmenylPLs, FAs, PEs, PSs, PIs, PAs, STs, TAGs	Demonstration of combination of cavitron ultrasonic surgical aspirator and sonic spray ionization mass spectrometry under conditions used in human surgical facilities for tissue	[258]

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				classification, to aid removal of malignant tissue. Statistical analysis of 284 histologically assigned spectra.	
Liver Skin (melanoma) Kidney	Porc Dog	REIMS-LIT-Orbitrap	PCs, PEs, SMs, TAGs, FAs, PSs, PIs, STs, PlasmenylPLs, PAs	Presentation of rapid evaporative ionization mass spectrometry performed with approved instruments used in surgical facilities as basis for future developments of MS-guided surgery. Examples of statistical tissue classification for kidney and malignant tumors.	[259]
Pancreas Muscle	Human	HV-MALDI-TOF/TOF HV-MALDI-FTICR	Not-identified lipids	Development of algorithms for efficient data reduction without losses of significant signals.	[261]
Brain	Zebra Finch	TOF-SIMS	FAs Chol	Biological study of the song nuclei as model for neural development	[262]
Brain	Zebra Finch	TOF-SIMS	FAs Chol	Biological study of the song nuclei at different developmental stages using statistical data analysis.	[263]
Eyestalk	Blue swimming crab	AP-MALDI-QTOF	PCs,TAGs, SM	Lipid imaging in the eye and eyestalk of a blue swimming crab.	[264]
Whole Body	Medaka (*Oryzias latipes*)	IP-MALDI-QIT	PCs	Visualization of lipids in Japanese killfish.	[265]
Seed	Cotton (Gossy-pium hirsutum)	IP-MALDI-LIT-Orbitrap	TAGs, DAGs, PCs, PEs, PAs	Imaging of lightly paraffin fixed, OCT-embedded cottonseeds for further unknown compartmentalization.	[266]
Fingerprint	–	DESI-LIT	FAs	Demonstration of MS imaging for specific fingerprints. Imaging of endo- and exogeneous substances	[273]
Fingerprints	–	IP-MALDI-QTOF	FAs, Chol	Investigation of impact of various environmental conditions on lipd imaging of fingerprints.	[274]
Fingerprints		IP-MALDI-QTOF	non-identified	Use of putative lipids and endogenous substances to visualize overlapping fingermarks.	[275]
Fingerprints	–	MP-MALDI-QTOF	Stearic and oleic acid	Visualization of fingerprints together with condom lubricants for forensic purposes.	[276]
Fingerprints	–	IP-MALDI-QTOF	TC, DAGs, TAGs, FAs	Presentation of a complete workflow for fingerprint imaging with established methods supplemented by MALDI-IMS.	[277]
Fingerprints		HV-MALDI-TOF	FAs	Imaging of overlapping fingerprints visualized by gold nanoparticles.	[278]
Cattle	Beef	HV-MALDI-TOF/TOF	PCs, TAGs	IMS for authenticity assessment of beef.	[279]
Grain	Rice (*oryza sativa*)	HV-MALDI-TOF/TOF	lysoPCs, PCs	IMS for authenticity assessment of rice.	[280]
Patina	–	TOF-SIMS	FAs, DAG	Imaging of constituents in patina of the Dogon statues.	[281]
Patina	–	TOF-SIMS	Stearic acid	Imaging of constituents in the patina of the Dogon-Tellem	[282]

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				statuary.	
Microbial mat	Gallionella	TOF-SIMS	PCs, DAGs, PEs	Detailed spectral characterization of 3 PCs, 2 PEs, 2DAGs and archaeol.	[283]
Picoliter vials	none	TOF-SIMS	PC, PE, PI PS, ST fragments, Chol	Demonstration of chemical specific subcellular imaging using picoliter vials and detection of characteristic lipid fragments.	[284]
Langmuir-Blodgett Film	-	TOF-SIMS	AA, DMPA	Investigation of the effect of instrumental parameters on depth resolution of data acquired from lipid multilayers.	[285]
Langmuir-Blodgett Film	–	TOF-SIMS	PC, SM, Chol	Imaging of model membrane system to investigate domain formation.	[286]
Langmuir-Blodgett Film		TOF-SIMS	Chol, SM, PC	Visualization of lipid-lipid interactions.	[287]
Langmuir-Blodgett Film	-	TOF-SIMS	POPC, SM, Chol	Imaging and further characterization of domain formation.	[288]
Langmuir-Blodgett film	–	TOF-SIMS	DPPC	Study of changes in the physical state of monomolecular layers.	[289]
Langmuir-Blodgett Film	–	TOF-SIMS	PC, PE fragments, Chol	Study of self-assembled lipid domain structures.	[290]
Supported lipid membrane	–	TOF-SIMS	DSPC-, DLPC-, DPPC- fragments	Statistical analysis of domains within phase separated lipid membranes.	[291]
Cells	Mast cells (RBL-2H3)	TOF-SIMS	Chol, PE, PC fragments	Statistical treatment of low counting rates associated with subcellular high resolution TOF-SIMS images.	[292]
Cells	Macrophages (J774), Glial Cells (Sprague-Dawley rat)	TOF-SIMS	Chol, PC fragment	Description of sample preparation technique for improved biovacuum interface reproducibility and enhanced ionization efficiency.	[293]
Neuroblastoma cells Brain	Cell culture Rat (Wistar)	TOF-SIMS	PCs, SMs, Cholesterol	Comparison of SIMS, ME-SIM and MetA-SIMS	[294]
Cells	Human capillary blood	TOF-SIMS	Chol	Presentation of an imprinting procedure for single cell analysis.	[295]
Cells	P12 cells	TOF-SIMS	PE and PC-fragments	Relative quantification of lipid accumulation in cells incubated with isotopically labeled fatty acids and their impact on exocytosis.	[296]
Cells (neurons)	SCG (mouse)	TOF-SIMS	FAs, PL-fragments, PCs	Sub cellular imaging of SCG neurons.	[297]
Cells (neurons)	SCG (mouse)	HV-MALDI-TOF/TOF TOF-SIMS	FAs, PL-fragments, PCs	Sub cellular imaging of SCG neurons with MALDI and comparison to TOF-SIMS ion images..	[298]
Cells	Bulb (*A. cepa*)	LAESI-QTOF	MAG, DAGs	OPLS-DA for discrimination of different cell types. Information about lipids can be found in supplementary data.	[299]
Spinal Cord	Rat (Long-Evans)	HV-MALDI-TOF/TOF	PCs, PEs	Application of stretched sample method for prolonged extraction times and suppression of cationized species.	[303]

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Cells	Tetrahymena	TOF-SIMS	PC-fragments	Visualization of cell morphology during mating of Tetrahymena.	[304]
Cells	Tetrahymena	TOF-SIMS	2-AEP, PC fragments	Visulization of membrane fusion for mating Cells to correlate structure and lipid redistribution.	[305]
Cells	Macrophages (J774)	dQTOF-SIMS	Chol	Presentation of prototype MS/MS capable TOF-SIMS instrument that has decoupled mass analysis step. MS/MS investigation of cholesterol.	[306]
Cells	Thyroid carcinoma cell line SW1736	TOF-SIMS	PL fragments	3D imaging at subcellular level via sequential sputtering with a C_{60} gun and repeated analysis with Bi-cluster gun.	[307]
Cells	Human (HeLa)	TOF-SIMS	PC fragments	Presentation of method for imaging of elemental and molecular species within intact and FIB milled mammalian cells.	[308]
Cells	*Euglena gracilis*	HV-MALDI-TOF/TOF	PLs	Single cell imaging of algal cells with MALDI, fluorescence and raman microspectroscopy.	[309]
Cells (neurons)	*Aplysia californica*	HV-MALDI-TOF/TOF	Not specified	Application of stretched sample method for single cell imaging with laser beam diameters considerably larger than single cells.	[311]
Cells	Human (HeLa, cheek, BPH) *X. laevis* (blastomer)	dTOF/TOF-SIMS	PC-fragments, Chol,	Demonstration of cellular imaging capabilities of newly developed decoupled TOF/TOF-SIMS system employing C^{+}_{60} primary ions.	[312]
Brain	Rat (Long-Evans)	TOF-SIMS	PC-fragments, Chol	Visualization of lipid distributions. LMW-fragments (CN^-, PO_2^-) in combination with scanning probe microscopy for subcellular images.	[313]
Kidney	Rat	TOF-SIMS	PL fragments	Subcellular imaging of Na^+,K^+ using HPF-FF sample preparation to illustrate ion transport in the kidney.	[314]
Kidney	Mouse (CD-1)	AP-MALDI-LIT-Orbitrap	PCs	Investigation of drug compound distributions on cellular levelI. Images of PC species were used to visualize histological features.	[321]
Pituitary gland	Mouse (C57BL/6)	AP-MALDI-Orbitrap	PC	Imaging of peptides at cellular level (5µm), utilization of PC signal as ubiquitous lipid for validation purposes.	[329]
flowers, fruits, leaves, tubers, bulbs, seeds	white lily, banana, tomato, strawberry, cilantro, peace lily, potato, onion, garlic, almond	AP-IR-LDI-QTOF	TAGs	Suitability assessment of AP-IR-LDI for plant metabolomics studies. Detection of broad range of substances including lipids, amino acids, carbohydrates and organic acids.	[330]
Muscle (leg)	Mouse (ICR)	HV-MALDI-TOF/TOF	PCs, TAGs, DAGs, SM, Fas	Visualization of relative changes in lipid composition during muscle contraction.	[333]