# SUPPLEMENTARY MATERIALS

**Supplementary Table 1: Age distributions of each condition.** N denotes number of samples per condition. Label shows the distribution of ages between predefined age ranges.

|  | ***1* Median (IQR); n (%)** | **Label** | | |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Age** | **young (0-29)** | **adult (30-69)** | **old (70+)** |
| **Healthy, N = 1,352*1*** | **50 (39, 62)** | **130 (9.6%)** | **1,021 (76%)** | **201 (15%)** |
| **Cancer, N = 600*1*** | **68 (64, 73)** | **0 (0%)** | **370 (62%)** | **230 (38%)** |
| **AMD, N = 388*1*** | **83 (75, 89)** | **0 (0%)** | **48 (12%)** | **340 (88%)** |
| **Dilated cardiomyopathy (DCM), N = 166*1*** | **54 (47, 59)** | **9 (5.4%)** | **157 (95%)** | **0 (0%)** |
| **AD, N = 84*1*** | **87 (81, 91)** | **0 (0%)** | **3 (3.6%)** | **81 (96%)** |
| **Serous Ovarian Cancer Tumor, N = 79*1*** | **67 (61, 72)** | **0 (0%)** | **55 (70%)** | **24 (30%)** |
| **Major depression, N = 60*1*** | **46 (39, 53)** | **10 (17%)** | **48 (80%)** | **2 (3.3%)** |
| **Schizophrenia, N = 57*1*** | **42 (35, 50)** | **5 (8.8%)** | **52 (91%)** | **0 (0%)** |
| **Bipolar disorder, N = 55*1*** | **51 (40, 56)** | **6 (11%)** | **47 (85%)** | **2 (3.6%)** |
| **Insulin resistant, N = 51*1*** | **61 (53, 66)** | **0 (0%)** | **46 (90%)** | **5 (9.8%)** |
| **Dysplasia, N = 50*1*** | **64 (55, 69)** | **0 (0%)** | **39 (78%)** | **11 (22%)** |
| **Alzheimer’s, N = 49*1*** | **88 (85, 91)** | **0 (0%)** | **2 (4.1%)** | **47 (96%)** |
| **Hypertrophic cardiomyopathy (HCM), N = 27*1*** | **51 (43, 57)** | **3 (11%)** | **24 (89%)** | **0 (0%)** |
| **Unknown, N = 7*1*** | **61 (60, 64)** | **0 (0%)** | **6 (86%)** | **1 (14%)** |
| **Early age-related maculopathy, N = 6*1*** | **85 (73, 86)** | **0 (0%)** | **2 (33%)** | **4 (67%)** |
| **Late non-exudative age-related maculopathy, N = 6*1*** | **86 (84, 93)** | **0 (0%)** | **0 (0%)** | **6 (100%)** |
| **Peripartum cardiomyopathy (PPCM), N = 6*1*** | **32 (27, 41)** | **2 (33%)** | **4 (67%)** | **0 (0%)** |
| **Adenocarcinoma, N = 2*1*** | **31 (31, 31)** | **0 (0%)** | **2 (100%)** | **0 (0%)** |
| **Early AMD, N = 2*1*** | **87 (87, 87)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |
| **Late AMD, N = 2*1*** | **87 (87, 87)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |
| **Late exudative age-related maculopathy, N = 2*1*** | **87 (87, 87)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |
| **Other (RPEcell epithelial dystrophy (suspected)), N = 2*1*** | **86 (86, 86)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |
| **Rheumatoid arthritis, N = 2*1*** | **72 (72, 72)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |
| **AMD or AMD, N = 1*1*** | **80 (80, 80)** | **0 (0%)** | **0 (0%)** | **1 (100%)** |
| **Healthy gingiva; Hypertension, N = 1*1*** | **66 (66, 66)** | **0 (0%)** | **1 (100%)** | **0 (0%)** |
| **Healthy gingiva; Liver cancer, N = 1*1*** | **64 (64, 64)** | **0 (0%)** | **1 (100%)** | **0 (0%)** |
| **Healthy gingiva; Osteoporosis, N = 1*1*** | **66 (66, 66)** | **0 (0%)** | **1 (100%)** | **0 (0%)** |
| **Sporadic ALS, N = 1*1*** | **67 (67, 67)** | **0 (0%)** | **1 (100%)** | **0 (0%)** |

**Supplementary Table 2: Age distributions of each tissue.** N denotes number of samples per condition. Label shows the distribution of ages between predefined age ranges.

|  | ***1* Median (IQR); n (%)** | **label** | | |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Age** | **young (0-29)** | **adult (30-69)** | **old (70+)** |
| **NSCLC, N = 600*1*** | **68 (64, 73)** | **0 (0%)** | **370 (62%)** | **230 (38%)** |
| **Retina, N = 521*1*** | **81 (72, 88)** | **0 (0%)** | **93 (18%)** | **428 (82%)** |
| **Adipose;, N = 382*1*** | **41 (38, 46)** | **8 (2.1%)** | **374 (98%)** | **0 (0%)** |
| **Heart;Left Ventricle, N = 361*1*** | **56 (48, 62)** | **25 (6.9%)** | **313 (87%)** | **23 (6.4%)** |
| **Blood;PBMC, N = 172*1*** | **f38 (29, 51)** | **44 (26%)** | **128 (74%)** | **0 (0%)** |
| **Brain; DLPFC, N = 118*1*** | **47 (39, 53)** | **10 (8.5%)** | **104 (88%)** | **4 (3.4%)** |
| **Brain; fusiform gyrus, N = 116*1*** | **86 (81, 91)** | **0 (0%)** | **3 (2.6%)** | **113 (97%)** |
| **Brain; AnCg, N = 113*1*** | **46 (39, 55)** | **11 (9.7%)** | **98 (87%)** | **4 (3.5%)** |
| **Ovary;, N = 105*1*** | **66 (61, 72)** | **0 (0%)** | **75 (71%)** | **30 (29%)** |
| **Blood;Erythroblasts, N = 94*1*** | **60 (53, 65)** | **0 (0%)** | **86 (91%)** | **8 (8.5%)** |
| **Lung;Bronchial brushing, N = 82*1*** | **64 (57, 69)** | **0 (0%)** | **63 (77%)** | **19 (23%)** |
| **Pancreatic islet, N = 62*1*** | **58 (53, 63)** | **0 (0%)** | **57 (92%)** | **5 (8.1%)** |
| **Liver;liver hepatocytes, N= 601** | **44 (29, 54)** | **16 (27%)** | **43 (72%)** | **1 (1.7%)** |
| **Brain;prefrontal cortex, N = 49*1*** | **88 (85, 91)** | **0 (0%)** | **2 (4.1%)** | **47 (96%)** |
| **Bone marrow; erythroid precursors, N = 30*1*** | **51 (28, 56)** | **13 (43%)** | **17 (57%)** | **0 (0%)** |
| **Bone marrow; haematopoietic stem and progenitor cells, N = 29*1*** | **54 (30, 56)** | **8 (28%)** | **21 (72%)** | **0 (0%)** |
| **Bone marrow; monocytes/macrophages and precursors, N = 27*1*** | **54 (30, 56)** | **8 (30%)** | **19 (70%)** | **0 (0%)** |
| **Bone marrow; lymphocytes and precursors, N = 25*1*** | **54 (28, 56)** | **10 (40%)** | **15 (60%)** | **0 (0%)** |
| **Retina; peripheral retina, N = 23*1*** | **84 (76, 86)** | **0 (0%)** | **4 (17%)** | **19 (83%)** |
| **Bone marrow; mesenchymal stem/stromal cells, N = 16*1*** | **39 (24, 55)** | **8 (50%)** | **8 (50%)** | **0 (0%)** |
| **Retina; peripheral RPE-choroid-sclera, N = 15*1*** | **85 (83, 86)** | **0 (0%)** | **1 (6.7%)** | **14 (93%)** |
| **Bone marrow; mononuclear cells, N = 8*1*** | **49 (45, 52)** | **1 (13%)** | **7 (88%)** | **0 (0%)** |
| **Retina; macular RPE/choroid/sclera, N = 8*1*** | **71 (63, 81)** | **0 (0%)** | **3 (38%)** | **5 (63%)** |
| **Retina; macular retina, N = 8*1*** | **71 (63, 81)** | **0 (0%)** | **3 (38%)** | **5 (63%)** |
| **Retina; peripheral RPE/choroid/sclera, N = 8*1*** | **71 (63, 81)** | **0 (0%)** | **3 (38%)** | **5 (63%)** |
| **Blood;Activated T-Cells, N = 7*1*** | **53 (49, 66)** | **0 (0%)** | **6 (86%)** | **1 (14%)** |
| **Gingiva, N = 6*1*** | **42 (19, 66)** | **3 (50%)** | **3 (50%)** | **0 (0%)** |
| **Bone; osteoblasts, N = 4*1*** | **69 (66, 72)** | **0 (0%)** | **2 (50%)** | **2 (50%)** |
| **Olfactory epithelium, N = 4*1*** | **62 (60, 63)** | **0 (0%)** | **4 (100%)** | **0 (0%)** |
| **Cerebrospinal fluid; exosomes, N = 3*1*** | **60 (59, 64)** | **0 (0%)** | **3 (100%)** | **0 (0%)** |
| **Cervix; HeLa S3 cells, N = 2*1*** | **31 (31, 31)** | **0 (0%)** | **2 (100%)** | **0 (0%)** |
| **Retina; RPE, N = 2*1*** | **87 (87, 87)** | **0 (0%)** | **0 (0%)** | **2 (100%)** |

**Supplementary Table 3: Top 10 up-regulated tissue-independent pathways.** Pathways are sorted by decreasing coefficient estimates. CP: Canonical pathways. CGP: Chemical and genetic perturbations.

|  | **Top 10 up-regulated tissue-independent pathways** | ***Category*** | ***n genes*** | ***Coefficient estimate*** |
| --- | --- | --- | --- | --- |
| **1** | BIOCARTA RHODOPSIN PATHWAY | CP | 11 | 0.090601850 |
| **2** | REACTOME ACTIVATION OF THE PHOTOTRANSDUCTION CASCADE | CP | 11 | 0.090402200 |
| **3** | PID RHODOPSIN PATHWAY | CP | 23 | 0.079535460 |
| **4** | MIKKELSEN IPS LCP WITH H3K4ME3 AND H3K27ME3 | CGP | 5 | 0.070753020 |
| **5** | REACTOME OPSINS | CP | 9 | 0.070558100 |
| **6** | PID CONE PATHWAY | CP | 23 | 0.069599400 |
| **7** | REACTOME ACETYLCHOLINE BINDING AND DOWNSTREAM EVENTS | CP | 14 | 0.068847760 |
| **8** | REACTOME HIGHLY CALCIUM PERMEABLE NICOTINIC ACETYLCHOLINE RECEPTORS | CP | 9 | 0.068847760 |
| **9** | REACTOME HIGHLY CALCIUM PERMEABLE POSTSYNAPTIC NICOTINIC ACETYLCHOLINE RECEPTORS | CP | 11 | 0.068847760 |
| **10** | REACTOME HIGHLY SODIUM PERMEABLE POSTSYNAPTIC ACETYLCHOLINE NICOTINIC RECEPTORS | CP | 7 | 0.068847760 |

**Supplementary Table X4: Top 10 down-regulated tissue-independent pathways.** Pathways are sorted by increasing coefficient estimates. CP: Canonical pathways. CGP: Chemical and genetic perturbations.

|  | **Top 10 down-regulated tissue-independent pathways** | ***Category*** | ***n genes*** | ***Coefficient estimate*** |
| --- | --- | --- | --- | --- |
| **1** | KORKOLA CHORIOCARCINOMA | CGP | 7 | -0.046989880 |
| **2** | REACTOME AMINO ACID CONJUGATION | CP | 9 | -0.046259260 |
| **3** | BIOCARTA TCAPOPTOSIS PATHWAY | CP | 9 | -0.044700030 |
| **4** | BIOCARTA THELPER PATHWAY | CP | 12 | -0.042427500 |
| **5** | BIOCARTA TCRA PATHWAY | CP | 14 | -0.042419040 |
| **6** | BIOCARTA TCYTOTOXIC PATHWAY | CP | 12 | -0.041964470 |
| **7** | REACTOME PROSTANOID LIGAND RECEPTORS | CP | 9 | -0.040446270 |
| **8** | BIOCARTA CTL PATHWAY | CP | 13 | 0.039046460 |
| **9** | REACTOME FICOLINS BIND TO REPETITIVE CARBOHYDRATE STRUCTURES ON THE TARGET CELL SURFACE | CP | 5 | -0.036717150 |
| **10** | REACTOME LECTIN PATHWAY OF COMPLEMENT ACTIVATION | CP | 8 | -0.036717150 |