**Supplementary Table 1. Initial data of gene-disease association with code in six genetic resources**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Genes** | **Diseases** | **Predominant Subtype** | **Association** | **ClinGen** | **NCCN** | **OMIM** | **GHR** | **Gene****Cards** | **Gene-****NCBI** |
| *ATM* | Brain Tumor | Glioblastoma Multiforme | No Association |   |   |   |   | 1 |   |
| Breast Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Colorectal Cancer |   | Verified | 1 | 1 |   |   |   |   |
| Gastric Cancer |   | Verified |   |   |   | 1 |   |   |
| Lung Cancer | NSCLC | No Association |   |   |   | 1 |   |   |
| Melanoma |   | No Association |   |   |   | 1 |   |   |
| Ovarian Cancer |   | Uncertain | 9 | 9 |   | 1 |   |   |
| Pancreatic Cancer |   | Verified |   | 1 |   | 1 |   |   |
| Prostate Cancer |   | Verified |   | 1 |   |   |   |   |
| *BARD1* | Breast Cancer |  | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Colorectal Cancer |  | No Association | 9 |   |   |   |   |   |
| Ovarian Cancer |  | Uncertain | 9 |   |   | 1 | 1 |   |
| *BRCA1* | Breast Cancer |  | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Colorectal Cancer |  | No Association |   |   |   | 1 |   |   |
| Gastric Cancer |  | Uncertain |   | 9 |   | 1 |   |   |
| Ovarian Cancer |  | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Pancreatic Cancer |  | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Prostate Cancer |  | Verified |   | 1 |   | 1 |   |   |
| *BRCA2* | Breast Cancer |  | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Brain Tumor |  | No Association |   |   |  |  |  |  |
| Gastric Cancer |  | Uncertain |   | 9 |   |   |   |   |
| Melanoma |  | Verified |   | 1 |   | 1 |   |   |
| Ovarian Cancer |  | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Pancreatic Cancer |  | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Prostate Cancer |  | Verified |   | 1 | 1 | 1 |   | 1 |
| *CDH1* | Breast Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Central Nervous System (Benign) | Neural tube defect | Uncertain |   |   | 1 |   |   |   |
| Colorectal Cancer |   | No Association | 9 |   |   |   |   |   |
| Endometrial Cancer |   | No Association |   |   | 1 |   |   | 1 |
| Eye (Benign) | Hypertelorism | Verified |   |   | 1 | 1 |   |   |
| Facial Dysmorphism |   | Verified |   |   | 1 |   |   |   |
| Gastric Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Gastrointestinal (Benign) | Imperforate anus | Verified |   |   | 1 |   |   |   |
| Hair (Benign) | Distichiasis | Verified |   |   | 1 |   |   |   |
| Hand (Benign) | Clinodactyly | Verified |   |   | 1 |   |   |   |
| Nails (Benign) | Hypoplastic nails | Verified |   |   | 1 |   |   |   |
| Nose (Benign) | Choanal atresia | Verified |   |   | 1 |   |   |   |
| Orofacial Cleft | Cleft palate | Verified |   |   | 1 | 1 | 1 | 1 |
| Ovarian Cancer |   | No Association | 0 |   |   | 1 |   |   |
| Prostate Cancer |   | Uncertain |   |   | 1 |  |   | 1 |
| Teeth (Benign) |   | Verified |   |   | 1 |   |   |   |
| Thyroid (Benign) | Thyroid hypoplasia | Uncertain |   |   | 1 |   |   |   |
| *CHEK2* | Adrenal Cortical Carcinoma |   | No Association |   |   |   |   | 1 | 1 |
| Breast Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Colorectal Cancer |   | Verified | 9 | 1 | 1 | 1 |   |   |
| Gastric Cancer |   | Verified |   |   |   |   |   |   |
| Kidney Cancer |   | Verified |   |   |   |   |   |   |
| Leukemia | CLL | Uncertain |   |   |   |   | 1 | 1 |
| Lung Cancer |   | No Association |   |   |   | 1 |   |   |
| Ovarian Cancer |   | Uncertain |   |   |   | 1 |   |   |
| Prostate Cancer |   | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Sarcoma (Bone) | Osteosarcoma | Verified |   |   |   | 1 | 1 | 1 |
| Thyroid Cancer | Papillary Thyroid Cancer | Verified |   |   |   |   |   |   |
| *NF1* | Abnormal Facies |   | Uncertain |   |   | 1 |   |   |   |
| Blood Vessel (Benign) | Renal artery stenosis | Uncertain |   |   | 1 |   |   |   |
| Bone (Benign) | Bone Dysplasia | Verified | 1 |   | 1 |   |   |   |
| Brain Tumor | Astrocytoma | Uncertain |   |   | 1 |   |   |   |
| Brain Tumor | Hypothalamic tumor | Uncertain |   |   | 1 |   |   |   |
| Brain Tumor | Meningioma | Uncertain |   |   | 1 |   |   |   |
| Brain Tumor | Optic Glioma | Verified | 1 | 1 | 1 |   |   |   |
| Breast Cancer |   | Verified |  | 1 |   |   |   |   |
| Cafe-Au-Lait Spots |   | Verified | 1 |   | 1 |   | 1 | 1 |
| Congenital Heart Disease | Pulmonary Stenosis | Verified |   |   | 1 |   | 1 | 1 |
| Eye (Benign) | Iris Hamartoma | Verified | 1 |   | 1 |   |   |   |
| GIST |   | Verified |   | 1 |   |   |   |   |
| Intellectual Disability |   | Verified | 1 |   | 1 |   |   |   |
| Leukemia |   | Verified |   |   | 1 | 1 | 1 | 1 |
| Neuroendocrine | Duodenal carcinoid | Uncertain |   |   | 1 |   |   |   |
| Neurofibroma |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Ovarian Cancer |   | No Association | 0 |   |   |   |   |   |
| Paraganglioma |   | Verified | 1 |   |   |   |   |   |
| Parathyroid Neoplasm | Parathyroid Adenoma | Uncertain |   |   | 1 |   |   |   |
| Pheochromocytoma |   | Verified | 1 |   | 1 |   |   |   |
| Sarcoma | Malignant PeripheralNerve Sheath Tumor | Verified | 1 | 1 | 1 |   |   |   |
| Skin (Benign) | Skin Freckling | Verified | 1 |   | 1 |   |   |   |
| *PTEN* | Abnormal Facies |   | Uncertain |   |   | 1 |   |   |   |
| Autism |   | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Bladder Cancer |   | Uncertain |   |   | 1 |   |   |   |
| Brain Tumor |   | Verified | 1 |   |   |   |   | 1 |
| Brain Tumor | Cerebellar Gangliocytoma | Verified |   | 1 | 1 |   |   |   |
| Brain Tumor | Meningioma | Uncertain |   |   | 1 |   |   |   |
| Breast Cancer |   | Verified | 1 | 1 | 1 | 1 |   |   |
| Breast (Benign) |   | Uncertain |   |   | 1 |   |   |   |
| Central Nervous System (Benign) | Cerebrovascular Malformations | Verified | 1 | 1 | 1 | 1 |   |   |
| Cervical Cancer |   | Uncertain |   |   | 1 |   |   |   |
| Colorectal Cancer |   | Verified | 1 | 1 |   |   |   |   |
| Ear (Benign) | Hearing Loss | Uncertain |   |   | 1 |   |   |   |
| Endometrial Cancer |   | Verified | 1 | 1 | 1 |   |   |   |
| Eye (Benign) | Cataract | Uncertain |   |   | 1 |   |   |   |
| Facial Papules |   | Verified | 1 | 1 | 1 |   |   |   |
| Gastric Cancer |   | Uncertain | 9 | 9 |   |   |   |   |
| Genitourinary (Benign) | Hydrocele | Uncertain |   |   | 1 |   |   |   |
| GI Neoplasm | Hamartomatous Polyps | Verified | 1 | 1 | 1 |   |   |   |
| Head and Neck (Benign) | Oral Mucosal Papillomatosis | Verified |   | 1 | 1 |   |   |   |
| Head and Neck Cancer | Squamous Cell Carcinoma | Uncertain |   |   |   | 1 |   |   |
| Kidney Cancer | Renal Cell Carcinoma | Verified | 1 | 1 |   |   |   |   |
| Lipoma |   | Verified | 1 | 1 | 1 |   |   |   |
| Liver (Benign) | Hepatomegaly | Uncertain |   |   | 1 |   |   |   |
| Lung Cancer |   | Uncertain |   |   |   | 1 |   |   |
| Macrocephaly |   | Verified | 1 | 1 | 1 |   | 1 | 1 |
| Melanoma |   | Verified | 1 |   |   |   |   |   |
| Oropharynx (Benign) |   | Uncertain |   |   | 1 |   |   |   |
| Ovarian Cancer |   | No Association |   |   |   | 1 |   |   |
| Prostate Cancer |   | Uncertain |   |   | 1 |  |   | 1 |
| Skin (Benign) | Acral Keratoses | Verified | 1 | 1 | 1 |   |   |   |
| Skin (Benign) | Macular Pigmentationof Glans Penis | Verified | 1 | 1 |   |   |   |   |
| Skin (Benign) | Palmoplantar Keratoses | Verified |   | 1 | 1 |   |   |   |
| Skin (Benign) | Trichilemmoma | Verified | 1 | 1 | 1 |   |   |   |
| Skin Cancer (Non-Melanoma) | Squamous Cell Carcinoma | Uncertain |   |   |   |   | 1 |   |
| Spleen (Benign) | Splenomegaly | Uncertain |   |   | 1 |   |   |   |
| Thyroid (Benign) |   | Verified |   | 1 | 1 |   |   |   |
| Thyroid Cancer |   | Verified | 1 | 1 | 1 |   |   |   |
| Uterine Corpus (Benign) | Uterine Fibroids | Verified |   | 1 | 1 |   |   |   |
| *PALB2* | Breast Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 | 1 |
| Colorectal Cancer |   | Uncertain | 9 | 1 |   |   |   |   |
| Gastrointestinal (Benign) | Tracheoesophageal Fistula  | Uncertain |   |   |   |   | 1 |   |
| Ovarian Cancer |   | Verified | 1 | 1 |   | 1 |   |   |
| Pancreatic Cancer |   | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Prostate Cancer |   | Verified |   | 1 |   |   |   |   |
| *RECQL* | Breast Cancer |   | Verified | 1 |   |   |   |   |   |
| Ovarian Cancer |   | No Association | 0 |   |   |   |   |   |
| *STK11* | Bladder (Benign) | Bladder Polyps | Uncertain |   |   | 1 |   |   |   |
| Breast Cancer |   | Verified | 1 | 1 | 1 | 1 |   |   |
| Cervical Cancer | Cervical Adenoma Malignum | Verified | 1 | 1 |   |   |   |   |
| Colorectal Cancer |   | Verified | 1 | 1 |   |   |   |   |
| Endometrial Cancer |   | Verified | 1 | 1 | 1 |   |   |   |
| Gastric Cancer |   | Verified | 1 | 1 | 1 |   |   |   |
| GI Hamartomatous Polyps |   | Verified | 1 | 1 |   | 1 | 1 |   |
| Hepatobiliary Cancer |   | Verified |   | 1 |   |   |   |   |
| Lung Cancer |   | Verified | 1 | 1 | 1 | 1 | 1 |   |
| Nose (Benign) | Nasal Polyps | Uncertain |   |   | 1 |   |   |   |
| Ovarian Cancer |   | No Association | 0 |   |   | 1 |   |   |
| Ovarian Neoplasm | Non-Epithelial ovarian tumor | Verified |   | 1 |   |   |   |   |
| Ovarian Neoplasm | Sex Cord Tumor | Verified |   | 1 |   |   |   |   |
| Pancreatic Cancer |   | Verified | 1 | 1 |   |   | 1 | 1 |
| Respiratory (Benign) | Bronchial Polyps | Uncertain |   |   | 1 |   |   |   |
| Skin (Benign) | Perioral Freckling | Verified | 1 | 1 | 1 |   | 1 |   |
| Small Intestine Cancer |   | Verified | 1 | 1 |   |   |   |   |
| Testicular Neoplasm | Sertoli Cell Tumor | Verified | 1 | 1 |   |   | 1 | 1 |
| Thyroid Cancer |   | No Association |   |   | 1 |   |   |   |
| *TP53* | Adrenal Cortical Carcinoma |   | Verified |   | 1 | 1 |   | 1 | 1 |
| Bone (Benign) | Short Stature | Uncertain |   |   | 1 |   |   |   |
| Brain Tumor | Choroid Plexus Papilloma | Verified |   | 1 | 1 |   | 1 |   |
| Brain Tumor | Glioma | Verified |   |   | 1 | 1 |   | 1 |
| Brain Tumor | Medulloblastoma | Verified |   | 1 |   |   |   |   |
| Breast Cancer |   | Verified |   | 1 |   | 1 | 1 | 1 |
| Colorectal Cancer |   | Verified | 1 | 1 | 1 |   |   | 1 |
| Gastric Cancer |   | Uncertain |   | 9 | 1 |   |   |   |
| Head and Neck Cancer |   | No Association |   |   |   | 1 |   |   |
| Hepatobiliary Cancer | Hepatocellular Cancer | Verified | 1 |   |   |   |   | 1 |
| Lung Cancer |   | Uncertain |   |   | 1 |   |   |   |
| Melanoma |   | Uncertain |   |   |   | 1 |   |   |
| Nasopharyngeal Cancer |   | Uncertain |   |   |   |   |   | 1 |
| Ovarian Cancer |   | Uncertain | 9 |   |   |   |   |   |
| Pancreatic Cancer |   | Verified | 1 |   | 1 |   |   | 1 |
| Prostate Cancer |   | No Association |   |   | 1 |   |   |   |
| Sarcoma | Osteosarcoma | Verified |   | 1 | 1 | 1 | 1 | 1 |
| Sarcoma | Soft Tissue Sarcoma | Verified |   | 1 | 1 | 1 | 1 |   |
| Skin Cancer (Non-Melanoma) | Basal Cell Carcinoma | Uncertain |   |   | 1 |   |   | 1 |
| Wilms Tumor |   | Uncertain |   |   |   | 1 |   |   |

Abbreviations: GHR, GeneticsHomeRefence; NSCLC, non-small cell lung cancer; CLL, chronic lymphocytic leukemia

Note: The number ‘1’ indicates that the gene was associated with the disease/cancer in the resource. The number ‘0’ indicates that the gene’s association with the disease/cancer was refuted in the resource. The number ‘9’ indicates that the gene’s association with the disease/cancer was unclear in the resource. Blank space indicates association was not found in the resource.