Supplementary Table 1. Distribution of chromosomal aberrations.

Supplementary Table 2. Genetic associations of diseases related to low-dose radiation exposure (< 1 Gy)

|  |  |  |  |
| --- | --- | --- | --- |
| **Gene**  | **Genetic association disease**  | **Disease class**  | **OMIM disease**  |
| **Up-regulation**  |
| *EPAS1*  | Elite endurance, erythropoietin  | Normal variation  | Erythrocytosis, familial, 4  |
| **Down-regulation**  |
| *IKZF1*  |  |  | Leukemia, acute lymphoblastic  |
| *KLF6*  | 1. Diabetes type 2
2. Lung cancer
3. Prostate cancer
4. Prostate cancer prostatic hyperplasia
 | Cancer, metabolic  | 1. Gastric cancer, somatic
2. Prostate adenocarcinoma-1
3. Prostate cancer, somatic
 |
| *SMARCA2*  | Schizophrenia  |  |  |
| *F2R*  | 1. Coronary heart disease
2. Platelet aggregation
3. Coagulation, platelet receptor density and the response to SFLLRN
 | 1. Cardiovascular
2. Hematological
 |  |
| *HLA-DRA*  | 1. Arthritis
2. Rheumatoid
3. Carbamazepine hypersensitivity
4. Celiac disease
5. Crohn's disease
6. Diabetes type 1
7. Hepatitis
8. Fulminant non-A, non-B
9. HIV infection
10. IgA, IgD, IgG, IgM, latex-fruit syndrome
11. Multiple sclerosis
12. Myasthenia gravis
13. Oral lichen planus
14. Sarcoidosis
15. Spondyloarthropathies
16. Stroke
17. Ischemic
 | 1. Cardiovascular
2. Immune
3. Infection
 | 1. Risk alleles for multiple sclerosis identified by a genome-wide study
2. Sequence variants in IL10
3. ARPC2 and multiple other loci contribute to ulcerative colitis susceptibility
 |
| *SS18*  |  |  | Sarcoma, synovial  |
| *TNFSF10*  | 1. HIV
2. Multiple sclerosis
 | 1. Immune
2. Infection
 | 1. Cytokine-cytokine receptor interaction
2. Apoptosis
3. Natural killer cell mediated cytotoxicity
 |
| *VPS13A*  |  |  | Choreoacanthocytosis  |

Notes: 1) Classification criteria were FC > 2 and *p* < 0.005; 2) Gene annotation enrichment analysis, functional annotation clustering, BioCarta & KEGG pathway mapping, gene-disease association, homolog matches, and similar analyses were assessed using DAVID Bioinformatics Resources 6.7.

Supplementary Table 3. Cancer-related genes in chromosome abnormality regions according to array data

|  |  |  |  |
| --- | --- | --- | --- |
| **Genes implicated in cancer**  | **Related function**  | **Related disease**  | **Reference**  |
| **Down-regulated genes**  |  |   |
| *GPR113*  | 1. Neuropeptide signaling pathway
2. Orphan receptor
 | Non-small cell lung cancer  | Lee Y, *et al*. Carcinogenesis, 2013  |
| *CAGE1/(CTAG3)*  | Protein-coding gene  | 1. Lung squamous cell carcinoma
2. Urinary bladder carcinomas
 | Park S, *et al*. Biochim Biophys Acta, 2003 Kunze E, *et al*. Int J Mol Med, 2007  |
| *FEZ1*  | Tumor suppressor gene  | 1. Ovarian cancer
2. Breast carcinoma
3. Lung cancer
4. Gastric carcinoma
 | Califano D, *et al*. J Cell Physiol. 2010 Chen L, *et al*. Breast Cancer Res Treat. 2009 Toyooka S, *et al*. Clin Cancer Res. 2002 Y, Alder H, *et al*. Clin Cancer Res. 2001  |
| *POLR2F*  | Responsible for synthesizing messenger  | 1. Colorectal cancer
2. Adenocarcinoma metastases
 | Antonacopoulou AG, *et al*. Anticancer Res. 2008 Król M, *et al*. J Appl Genet. 2010  |
| *ZFHX3*  | 1. Myogenic regulation
2. Neuronal differentiation
3. Negative regulation of c-Myb
 | 1. Non-small cell lung cancer
2. Stomach cancers
3. Gastric and colorectal carcinomas
4. Skin cancer
5. Breast cancer
 | Minamiya Y, *et al*. Cancer Biomark. 2012 An CH, *et al*. Pathology. 2010 Nishio E, *et al*. Acta Dermatovenerol Croat. 2012 Kai K, *et al*. BMC Cancer. 2008  |
| *FYB/(ADAP; PRO0823; SLAP-130)*  | 1. Adapter for the FYN protein
2. LCP2 signaling cascades
3. Platelet activation
4. Controlling of interleukin-2 expression
 | 1. Hemolytic disease
2. Acute promyelocytic leukemia
 | Vescio LA, *et al*. Transfusion. 1987 Moog-Lutz C, *et al*. J Biol Chem. 2001  |
| *NMI*  | 1. Interaction with NMYC and CMYC
2. STAT-mediated transcription in response to cytokines IL2 and IFN-gamma
 | 1. Bladder cancer
2. Predicting progression of bladder urothelial carcinoma
3. Myeloid leukemia
4. T-cell acute lymphoblastic leukemia
 | Serretta V, *et al*. Urologia. 2013 Rosenberg E, *et al*. BJU Int. 2013 Bao J, *et al*. Oncogene. 1996 Nagel S, *et al*. Leuk Lymphoma. 2011  |
| **Up-regulated genes**  |  |  |  |
| *PHLDA1/(TDAG51)*  | 1. Anti-apoptotic effects of insulin-like growth factor-1
2. Follicular stem cell marker
 | 1. Oral squamous cell carcinomas
2. Basal cell carcinomas
3. Breast cancer
4. Desmoplastic trichoepithelioma
 | Coutinho-Camillo CM, *et al*. Virchows Arch. 2013 Sellheyer K, *et al*. J Cutan Pathol. 2013 Johnson EO, *et al*. J Cell Sci. 2011 Sellheyer K, *et al*. Br J Dermatol. 2011  |
| *CMTM5/(CKLFSF5)*  | 1. Exhibition of tumor suppressor activity
2. Inducing apoptosis
 | 1. Ovarian cancer
2. Myeloid leukemia
3. Pancreatic cancer
 | Li P, *et al*. Int J Gynecol Cancer. 2011 Niu J, *et al*. Leuk Res. 2011 Guo X, *et al*. Biochem Biophys Res Commun. 2009  |
| *PTCRA*  | Regulation of early T-cell development  | T-cell leukemia  | Bellavia D, *et al*. Proc Natl Acad Sci U S A, 2002  |
| *SAPCD2* (p42.3; C9orf140)  | Tumor-specific and mitosis phase-dependent expression  | 1. Human colorectal cancer
2. Gastric cancer
 | Yuan XS, *et al*. J Cancer Res Clin Oncol, 2013 Zhang J, *et al*. Theor Biol Med Model, 2012 Xu X, *et al*. Oncogene, 2007  |

Notes: 1) Screening criteria were FC > 4 and *p* < 0.005; 2) Identification of cancer-related genes was conducted using the Cancer Genetics Web, Atlas of Genetics and Cytogenetics in Oncology and Haematology database and the Tumor Gene Family of Databases.