

Find a Biomaker by Disease\*

Disease / Medical condition	Biomarker	Imaging Technique	Investigators	Comments	Disease Category
Abscess	Leukocyte accumulation	SPECT	Fischman AJ	Tc-99m HMPAO improvement over Tl-201 and Ga-67	Neurological Inflammatory Musculoskeletal Genitourinary Infectious disease Gastrointestinal
Abscess	Restricted diffusion	Diffusion weighted imaging	Grant E Gonzalez RG Schaefer P		Neurological Inflammatory Infectious disease
Acute myocardial infarction	Intravascular thrombus	MRI	Brady T		Cardiology / Vascular
Adenopathy, lymphoma and metastatic disease	Lesion volume	US CT MRI	Harisinghani M Mueller PR O'Neill MJ Saini S	Anatomic marker of disease presence	Oncology / Neoplasm Genitourinary
Adrenal neoplasm	Relative % contrast washout	CT	Boland GW Hahn PF Mueller PR	Differential diagnosis of adrenal masses	Oncology / Neoplasm Genitourinary
AIDS wasting syndrome	Body fat composition	CT	Rosenthal DI		Endocrine Metabolic Musculoskeletal Infectious disease Gastrointestinal
AIDS wasting syndrome / lipodystrophy	Increased abdominal visceral fat associated with decreased bone mineral density	Quantitative CT Dual energy X-ray absorptiometry (DEXA)	Rosenthal DI		Endocrine Metabolic Musculoskeletal Infectious disease Gastrointestinal
Allergic drug reaction	Increased pulmonary interstitial markings	CT	McLoud TC Shepard J		Endocrine Metabolic Inflammatory
Alveolar pulmonary edema	Pulmonary consolidation	CT MRI	McLoud T Shepard J		Cardiology / Vascular
Alzheimer's disease	Cerebral blood flow	Perfusion weighted imaging / Arterial spin labeling	Hoge R		Neurological Metabolic
Alzheimer's disease	Cerebral blood flow (CBF)	SPECT fMRI	Harris G Gonzalez RG Sorensen AG		Neurological Metabolic
Alzheimer's disease	Cerebral blood volume (CBV)	SPECT fMRI	Harris G Gonzalez RG Sorensen AG		Neurological Metabolic
Alzheimer's disease	Mean transit time (MTT)	SPECT fMRI	Harris G Gonzalez RG Sorensen AG		Neurological Metabolic
Alzheimer's disease	Directed molecular probes	PET SPECT Optical	Fischman A Weissleder R	Animal modeling Optical with exogenous contrast agents	Neurological Metabolic
Alzheimer's disease	Entorhinal cortex	MRI	Hyman B	Can distinguish normal from mild AD with 93% accuracy	Neurological Metabolic
Alzheimer's disease	Anterior cingulate size and thickness	MRI	Hyman B	Can distinguish normal from mild AD with 93% accuracy	Neurological Metabolic
Alzheimer's disease	Hippocampal size	MRI Quantitative volumetric morphometry	Dale A Hyman B Fischl B Kennedy D	Accurately indicates absence of disease progression in therapeutic trials - allows markedly reduced subject numbers	Neurological Metabolic

Disease

Alzheimer's disease	Myoinositol	MRS	Gonzalez RG Jenkins B		Neurological Metabolic
Alzheimer's disease	N-acetylaspartate (NAA)	MRS	Gonzalez RG Jenkins B		Neurological Metabolic
Alzheimer's disease	Neuritic (senile) plaque	In vivo multiphoton microscopy	Hyman B	Can use histochemical or immunofluorescence for amyloid B	Neurological Metabolic
Alzheimer's disease	Neuronal injury	MRI	Gonzalez RG		Neurological Metabolic
Alzheimer's disease	Oxygen utilization	Optical	Boas D Dunn A	Combining of multi-wavelength and laser speckle contrast imaging	Neurological Metabolic
Alzheimer's disease	Cerebral blood flow (CBF)	Optical	Boas D Dunn A	Combining of multi-wavelength and laser speckle contrast imaging	Neurological Metabolic
Amyloid arthropathy / crystalline disease	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory Metabolic
Ankle injury	Ligament tears	MR arthrography	Palmer WE	Predicts sensitivity for ankle impingement syndromes	Musculoskeletal
Anorexia	Relative cerebral blood flow (rCBF)	PET	Alpert N Fischman A Rauch SL		Neurological
Aortic aneurysm	Vascular diameter and circumference	US CT MRI	Waltman A		Cardiology / Vascular
Aortic dissection	Anatomic disruption of arterial wall	US CT MRI Angiography	Gonzalez R Waltman A		Cardiology / Vascular
Arterial embolism	Intravascular thrombus	CT MRI Angiography	Waltman A		Cardiology / Vascular
Atherosclerosis / central	Arterial calcification	CT	Brady T		Cardiology / Vascular Metabolic
Arteriosclerosis / central	Vascular lumen diameter	CTA MRA Angiography	Gonzalez R Hunter G Lev M Waltman A		Metabolic Cardiology / Vascular
Arteriosclerosis / peripheral	Arterial calcification	CT	Brady T		Cardiology / Vascular Metabolic
Arteriosclerosis / peripheral	Lumen vascular diameter	CTA MRA Angiography	Gonzalez R Hunter G Lev M Waltman A		Cardiology / Vascular Metabolic
Arthritis	Joint space narrowing	Plain radiographs	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Increased synovial glucose metabolism	PET	Fischman AJ Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Synovial thickening	MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / rheumatoid	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / septic	Cyst composition / tissue characterization	PET	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory

Disease

Arthritis / septic	Increased synovial glucose metabolism	MRI	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Arthritis / septic	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Arthritis / septic	Synovial thickening	Plain radiographs MRI	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Asphyxia	Altered vascular and tissue permeability	CT	Gonzalez RG Grant E		Neurological
Asphyxia	Early diffusion changes	Diffusion weighted imaging	Grant E Schaefer P Sorensen AG		Neurological
Asphyxia	Lactate : choline ratio	MRS	Jenkins B		Neurological
Attention deficit hyperactivity disorder (ADHD)	ACCd activation (anterior cingulate cortex division)	fMRI PET	Bush G Fischman A Rosen B		Neurological
Attention deficit hyperactivity disorder (ADHD)	Cortical thickness and asymmetry	MRI (morphometry)	Kennedy D		Neurological
Attention deficit hyperactivity disorder (ADHD)	Dopamine transporter density	SPECT	Fischman A Rauch SL		Neurological
Autism	Frontal language area	MRI	Caviness VS Harris G Kennedy D	Reversal of morphometric asymmetry in frontal language area	Neurological
Autism	Frontal language area	fMRI	Harris G	Abnormal fMRI activation of frontal language areas during semantic language tasks	Neurological
Aveolar bronchial cell carcinoma	Pulmonary consolidation	CT MRI	McCloud TC Shepard J		Oncology / Neoplasm
Benign prostatic hypertrophy	Prostate volume	US CT MRI	Hahn PF Mueller PR O'Neill MJ		Oncology / Neoplasm Genitourinary
Biliary obstruction	Biliary ductal dilatation	US CT MRI	Hahn P Mueller P		Gastrointestinal
Biliary parasitic disease	Biliary ductal dilatation	US CT MRI	Hahn P Mueller P O'Neill MJ		Gastrointestinal Infectious disease
Biliary stricture	MR cholangio-pancreatography	MRI	Prasad S Sahani D		Gastrointestinal
Bone fracture	Cortical surface disruption	Plain radiographs	Palmer W Rosenthal DI		Musculoskeletal
Bone fracture	Negative defect	Plain radiographs	Palmer W Rosenthal DI		Musculoskeletal
Bone fracture	Marrow edema	MRI -T1 Diffusion weighted imaging / Apparent diffusion constant	Palmer WE	Impact fractures demonstrate prominent edema, distraction fractures exhibit minimal edema	Musculoskeletal
Bone fracture	Water content	MRI -T1 Diffusion weighted imaging / Apparent diffusion constant	Palmer WE	Impact fractures demonstrate prominent edema, distraction fractures exhibit minimal edema	Musculoskeletal

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Bone fracture / healing	Osseous bridging	Plain radiographs MRI CT	Palmer W Rosenthal DI		Musculoskeletal Metabolic
Bone fracture / healing	Osteoblastic activity	Nuclear medicine	Fischman AJ		Musculoskeletal Metabolic
Bone fracture / healing and distraction osteogenesis wounds	Bone fill score and penetration depth	US	O'Neill MJ	Animal study Bone healing assessed by increased fill and decreased penetration depth	Musculoskeletal Metabolic
Brain development	Oxygen consumption	Optical Imaging	Boas D Dunn A	Diffuse optical imaging (DOI)	Neurological Metabolic
Brain development	Cerebral blood flow (CBF)	Optical Imaging	Boas D Dunn A	Diffuse optical imaging (DOI)	Neurological Metabolic
Brain development / -anencephaly -microcephaly -holoprosencephaly	Cortical thickness, volume and location	MRI morphometry fMRI	Caviness VS Dale A Fischl B Kennedy D		Neurological
Brain function	Cerebral blood flow (CBF )	MRI fMRI PET	Belliveau Kwong K Rosen BR	Response to stimuli	Neurological Metabolic
Brain function / neuronal content	N-acetylaspartate (NAA) Images	MRI chemical shift Echo-planar imaging (EPI)	Gonzalez RG Jenkins B Rosen B		Neurological Metabolic
Brain function / drugs of abuse	Cerebral blood volume (CBV)	fMRI	Jenkins B Kosofsky B Mandeville JB Rosen B	Response to stimuli	Neurological Metabolic
Brain function / drugs of abuse	rCMRO2	fMRI	Jenkins B Kosofsky B Mandeville JB Rosen B	Response to stimuli	Neurological Metabolic
Brain function / mapping dopaminergic neurotransmitter activity	Relative cerebral blood flow (rCBF)	Pharmacologic MRI PET fMRI	Bogdanov M Chen YC Jenkins B Rosen B	Using D-amphetamine and CFT	Neurological Metabolic
Brain function / mapping dopaminergic neurotransmitter activity	Relative cerebral blood volume (rCBV)	Pharmacologic MRI PET fMRI	Bogdanov M Chen YC Jenkins B Rosen B	Using D-amphetamine and CFT	Neurological Metabolic
Brain injury	Restricted water mobility	Diffusion weighted imaging Apparent diffusion constant	Huisman TA Gonzalez RG Schaefer P Sorensen AG	Cytotoxic edema, vasogenic edema and diffuse axonal injury	Neurological
Brain injury / toxicity and trauma	Focal atrophy	MRI	Caviness VS Kennedy D		Neurological
Breast neoplasm	Glucose metabolism	PET	Alpert NM Choi NC Fischman AJ		Oncology / Neoplasm
Breast neoplasm	Microcalcifications	Raman Spectroscopy	Feld MS (MIT)	Differential diagnosis of benign from malignant microcalcifications	Oncology / Neoplasm
Breast neoplasm	Microvascular blood volume	US	O'Neill MJ	Microbubble contrast agents	Oncology / Neoplasm
Breast neoplasm	Microvascular density	US	O'Neill MJ	Microbubble contrast agents	Oncology / Neoplasm
Breast neoplasm	Angiogenesis	US	O'Neill MJ	Microbubble contrast agents	Oncology / Neoplasm
Breast neoplasm	Presence of contralateral synchronous cancers	MRI	Kopans DB	4 of 17 patients (24%) had contralateral cancer occult to physical exam, mammography and US	Oncology / Neoplasm

Disease

Breast neoplasm	Regional blood flow and blood volume	MRI	Kopans DB	Magnetic susceptibility-based contrast agent OR GD-DTPA with dynamic echo planar imaging	Oncology / Neoplasm
Breast neoplasm	Microvessel density (MVD)	MRI	Kopans DB	Magnetic susceptibility-based contrast agent OR GD-DTPA with dynamic echo planar imaging	Oncology / Neoplasm
Breast neoplasm	Tumor associated enzymatic activity	Optical Near infrared spectroscopy	Bremer C Bogdanov A Weissleder R	Expression levels of cathepsin-B activity in animal models of breast cancer	Oncology / Neoplasm
Breast neoplasm	Tumor volume	MRI	Harris G		Oncology / Neoplasm
Calculus disease	MR cholangio-pancreatography	MRI	Sahani D Prasad S		Endocrine Gastrointestinal
Carotid dissection	Anatomic disruption of arterial wall	US CT / CTA MRI / MRA Angiography	Gonzalez R Waltman A		Neurological Cardiology / Vascular
Cartilage abnormalities	Articular cartilage and subchondral bone thickness	MRI	Palmer WE	MR using fat-suppressed SPGR images	Musculoskeletal
Cerebral malaria	Diffuse cerebral edema with thalamic +/- cerebellar hypo-attenuation	CT	Gonzalez RG		Neurological Infectious disease
Cholangio-carcinoma	Liver tissue characterization	MRI	Hahn PF Halpern EF Sahani D	Using combined ferrumoxide / Gd-DPTA	Oncology / Neoplasm Gastrointestinal
Cholangitis	Biliary ductal dilatation	MRI	Prasad S Sahani D	MR cholangio-pancreatography	Gastrointestinal Infectious disease Inflammatory
Cholangitis	Ductal dilatation	MRI	Prasad S Sahani D	MR cholangio-pancreatography	Gastrointestinal Infectious disease Inflammatory
Cholecystitis	Gallstones	US CT MRI	Hahn P Mueller P O'Neill MJ		Endocrine Inflammatory Infectious disease Gastrointestinal
Cholecystitis	Gallbladder wall thickening	US CT MRI	Hahn P Mueller P O'Neill MJ		Endocrine Inflammatory Infectious disease Gastrointestinal
Choledo-cholelithiasis	Biliary ductal dilatation	US CT MRI	Hahn PF O'Neill MJ Mueller P		Endocrine Inflammatory Gastrointestinal Metabolic
Cholelithiasis	Gallstones	US CT MRI	Hahn P Mueller P O'Neill MJ		Endocrine Inflammatory Gastrointestinal Metabolic
Cirrhosis	Caudate lobe enlargement	MRI CT	Hahn PF Sahani D	Discrimination of alcohol from virus-induced cirrhosis	Gastrointestinal Infectious disease Inflammatory
Cirrhosis	Right posterior hepatic notch	MRI CT	Hahn PF Sahani D	Discrimination of alcohol from virus-induced cirrhosis	Gastrointestinal Infectious disease Inflammatory
CNS AIDS / fungal and opportunistic infections	Focal brain uptake	PET SPECT	Fischman A		Neurological
CNS AIDS / neuroinflammation neurodegeneration	N-acetylaspartate (NAA)	MRS	Gonzalez R Schaefer P Schwamm LH		Neurological

Disease

CNS AIDS / neuroinflammation neurodegeneration	Choline	MRS	Gonzalez R Schaefer P Schwamm LH		Neurological
CNS AIDS / neuroinflammation neurodegeneration	Myoinositol (MI)	MRS	Gonzalez R Schaefer P Schwamm LH		Neurological
CNS neoplasm / primary and secondary	Microvascular blood volume and microvascular density	fMRI MRI	Belliveau Kennedy D Rosen BR		Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	N-acetylaspartate (NAA)	MRS	Gonzalez R Husiman TA Sorensen AG	Metabolism, tumor viability and response to therapy	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Choline	MRS	Gonzalez R Husiman TA Sorensen AG	Metabolism, tumor viability and response to therapy	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Lactate	MRS	Gonzalez R Husiman TA Sorensen AG	Metabolism, tumor viability and response to therapy	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Phosphocreatine	MRS	Gonzalez R Husiman TA Sorensen AG	Metabolism, tumor viability and response to therapy	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Tumor angiogenesis	MRI MRS MRA	Davis T Rosen B Wald LL Weissleder R	Measured by dynamic susceptibility contrast (DSC) and monocrySTALLINE iron oxide nanoparticles (MION)	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary, presence and viability	Glucose metabolism	PET	Alpert N Choi N Fischman A Kennedy D Rosen B	Non-specific marker with wide variety of applications	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Lesion volume	CT MRI morphometry	Gonzalez R Harris G Kennedy D Lev Schaefer P Sorensen AG	Anatomic marker of disease presence Response to therapy	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary	Tumor growth rate	MRI	Bogdanov A Weissleder R	Serial studies of tumor volume using uptake of long-circulating dextrin coated iron oxide (LCDIO) Rodent model	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary, presence and viability	Oxygen consumption	Optical	Boas D Dunn A	Diffuse Optical imagine (DOI)	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary, presence and viability	Cerebral blood flow (CBF)	Optical	Boas D Dunn A	Diffuse optical imagine (DOI)	Neurological Oncology / Neoplasm
CNS neoplasm / primary and secondary, presence and viability	Targeted cellular and molecular probes	Optical MRI PET	Kwong KK Weissleder R	Exogenous contrast agents Animal models	Neurological Oncology / Neoplasm
CNS Neoplasm / schwannoma and neurofibromatosis	Tumor growth rate	MRI	Tang Y Weissleder R	Transgenic murine models of neurofibromatosis	Neurological Oncology / Neoplasm
Colorectal carcinoma	99mTc labeled monoclonal antibody	SPECT	Fischman AJ	Phase III clinical trial with HumaSPECT-Tc	Oncology / Neoplasm Gastrointestinal

Disease

Connective tissue disorders	Increased pulmonary interstitial markings	CT	McCloud TC Shepard J		Inflammatory
Coronary artery disease	Arterial calcification	CT	Brady T		Cardiology / Vascular Metabolic
Coronary artery disease	Myocardial blood flow via 13N-ammonia	Nuclear medicine SPECT	Fischman A		Cardiology / Vascular Metabolic
Coronary artery disease	Myocardial contractility / function	MRI Nuclear Medicine	Brady T Fischman A		Cardiology / Vascular Metabolic
Coronary artery disease	Myocardial perfusion	Nuclear medicine	Fischman A		Cardiology / Vascular Metabolic
Crohn's disease	Bowel wall differentiation	MR enteroclysis	Hahn P	Use of experimental oral contrast Kaolin, locus bean gum, methylcellulose + Barium	Gastrointestinal Inflammatory
Crohn's disease	Inflammation	MR enteroclysis	Hahn P	Use of experimental oral contrast Kaolin, locus bean gum, methylcellulose + Barium	Gastrointestinal Inflammatory
Deep venous thrombosis	Intravascular thrombus	US MRI Angiography	O'Neill MJ Waltman A		Cardiology / Vascular
Dementia	Blood oxygen level depletion (BOLD)	fMRI	Rosen B		Neurological
Dementia	Cerebral blood flow (CBF)	MRI / arterial spin labeling	Hoge R		Neurological
Diabetes	Directed molecular probes for beta cell mass	MRI	Moore A Bogdanov AJ Weissleder R		Metabolic Endocrine
Dissection / peripheral	Vascular lumen diameter	CT MRI Angiography	Waltman A		Cardiology / Vascular
Dyskinesia (PNKD)	Dopa decarboxylase activity	PET	Fischman A		Neurological Musculoskeletal
Elbow injury / collateral ligament	Partial thickness and full thickness tears	MR arthrography	Palmer WE	Distinguishes thickness of tears	Musculoskeletal
Encephalitis / west Nile virus	Thalamus and substantia nigra hyperintensities	MRI	Gonzalez RG Sorensen AG	Disease confirmation and progression monitoring	Neurological Infectious disease Inflammatory
Epilepsy	Cortical dysplasia	MRI / MEG fMRI	Dale A Grant E Mandeville J Rosen B Stufflebeam SM Wald LL		Neurological
Epilepsy	Hyperperfusion	MRI / arterial spin labeling	Hoge R Kwong KK		Neurological
Epilepsy	Cerebral blood flow (CBF)	MRI / arterial spin labeling	Hoge R Kwong KK		Neurological
Epilepsy	N-acetylaspartate (NAA) lateralization	MRS	Jenkins BG		Neurological
Epilepsy	Seizure focus	MEG / EEG	Halgren E Stufflebeam SM		Neurological

Disease

Fibrocystic change	Cyst composition / tissue characterization	US CT MRI	Kopans DB		Oncology / Neoplasm
Ganglion cyst	Cyst composition / tissue characterization	US CT MRI	Rosenthal DI		Musculoskeletal Inflammatory
Gastrointestinal bleeding	Intraluminal hemorrhage	SPECT	Fischman AJ		Gastrointestinal
Glioma	Blood-tumor barrier permeability (BTP)	MRI fMRI	Gonzalez RG Kwong KK Sorensen AG Weissleder R		Neurological Oncology / Neoplasm
Glioma	Cerebral blood volume (CBV)	MRI fMRI	Gonzalez RG Sorensen AG Rosen B		Neurological Oncology / Neoplasm
Glioma	Cerebral blood flow (CBF)	MRI fMRI	Gonzalez RG Sorensen AG Rosen B		Neurological Oncology / Neoplasm
Glioma	Glucose uptake	PET	Fischman A Kennedy D Rosen B		Neurological Oncology / Neoplasm
Glioma	Tumor angiogenesis	MRI MRS MRA	Davis T Rosen B Wald LL Weissleder R	Measured by dynamic susceptibility contrast (DSC) and monocrystalline iron oxide nanoparticles (MION)	Neurological Oncology / Neoplasm
Glioma	Tumor margin	MRI	Weissleder R	Via ultra small particulate iron oxide (USPIO)	Neurological Oncology / Neoplasm
Glioma	Vascular volume fraction	Optical	Weissleder		Neurological Oncology / Neoplasm
Head and neck neoplasm / primary and secondary	Glucose metabolism	PET	Alpert N Choi N Fischman A	Non-specific marker with wide variety of applications	Neurological Oncology / Neoplasm
Head and neck neoplasm / primary and secondary	Lesion volume	CT MRI	Gonzalez R Lev MH Schaefer P Schwamm Sorensen AG	Anatomic marker of disease presence	Neurological Oncology / Neoplasm
Hepatic cysts	Liver tissue characterization	MRI US	Hahn PF Harisinghani M Mueller PR O'Neill MJ Weissleder R	Using ultrasmall superpara-magnetic iron oxide, mangafodipir trisodium	Gastrointestinal
Hepatic encephalopathy	N-acetylaspartate (NAA)	MRS	Grant E Jenkins BG Schaefer P		Neurological
Hepatic encephalopathy	Glucose	MRS	Grant E Jenkins BG Schaefer P		Neurological
Hepatic encephalopathy	Choline	MRS	Grant E Jenkins BG Schaefer P		Neurological
Hepatic encephalopathy	Lactate	MRS	Grant E Jenkins BG Schaefer P		Neurological
Hepatic focal nodular hyperplasia	Liver tissue characterization	MRI	Hahn PF Halpern EF Sahani D	Using combined ferumoxide / Gd-DPTA	Oncology / Neoplasm Gastrointestinal Endocrine

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Hepatic focal nodular hyperplasia	Liver tissue characterization	MRI	Hahn PF Harisinghani M Mueller PR Weissleder R	Using ultras small superpara-magnetic iron oxide, mangafodipir trisodium	Oncology / Neoplasm Gastrointestinal Endocrine
Hepatic hemangioma	Liver tissue characterization	MRI US	Hahn PF Harisinghani M Mueller PF O'Neill MJ Saini S Weissleder R	Using ultras small superpara-magnetic iron oxide OR Gd-based chelates	Oncology / Neoplasm Gastrointestinal
Hepatic neoplasm / primary and secondary	Glucose metabolism	PET	Fischman AJ	Non-specific marker with wide variety of applications	Oncology / Neoplasm Gastrointestinal
Hepatic neoplasm / primary and secondary	Lesion detection	MRI	Hahn PF Harisinghani M Saini S Weissleder R	Increased SNR and CNR with liver specific contrast agent GD-BOPTA and mangafodipir	Oncology / Neoplasm Gastrointestinal
Hepatic neoplasm / primary and secondary	Lesion volume	US CT MRI	Harris G Mueller PR O'Neill MJ Saini S	Anatomic marker of disease presence	Oncology / Neoplasm Gastrointestinal
Hepatic neoplasm / primary and secondary	Vascular architecture	Multidector CT angiography (MDCTA)	Hahn PF Mueller PR Saini S Sahani D	Presurgical treatment planning	Oncology / Neoplasm Gastrointestinal
Hepatobiliary disorders	Liver tissue characterization	MRI	Hahn P Harisinghani M Mueller P Weissleder R	Using ultras small superpara-magnetic iron oxide, mangafodipir trisodium	Gastrointestinal
Hepatocellular carcinoma	Liver tissue characterization	MRI	Hahn PF Harisinghani M Mueller PR Weissleder R	Using ultras small superpara-magnetic iron oxide, mangafodipir trisodium	Oncology / Neoplasm Gastrointestinal
Hepatocellular carcinoma	Liver tissue characterization	MRI	Hahn PF Halpern EF Harisinghani M Sahani D	Using combined ferrumoxide / Gd-DPTA	Oncology / Neoplasm Gastrointestinal
HIV	Directed molecular probes	MRI PET Optical	Weissleder R		Infectious disease
HIV	Increased Cerebral blood volume (CBV)	fMRI	Gonzalez RG Hunter G	Cerebral injury related to HIV infection	Infectious disease
Hodgkin's disease	N-acetylaspartate (NAA)	MRS	Jenkins B Kennedy D Rosas D Rosen BR		Oncology / Neoplasm
Huntington's disease	Basal ganglia / putamen volume	MRI	Harris G		Neurological
Huntington's disease	Cortical thickness	fMRI MRI morphometry	Dale A Fischl B Harris G Kennedy D Rosas D		Neurological
Huntington's disease	Directed molecular probes	MRI PET Optical	Fischman A Weissleder R		Neurological
Huntington's disease	N-acetylaspartate (NAA)	MRS	Jenkins BG Rosen B		Neurological
Huntington's disease	Choline : creatine ratio	MRS	Jenkins BG		Neurological

Disease

Huntington's disease	Lactate	MRS	Jenkins BG Rosen B		Neurological
Hypertension	Relative cerebral blood volume (rCBV)	Dynamic susceptibility contrast MRI	Hunter G Rosen B	Using Gd-DTPA following L-arginine infusion	Neurological Cardiology / Vascular
Iliac aneurysm	Vascular diameter and circumference	US CT MRI	Waltman A		Cardiology / Vascular
Infectious disease / -empyema -herpes virus -CJD	Restricted diffusion	Diffusion weighted imaging	Grant, E Schaefer P		Neurological Infectious disease
Infectious disease / cerebral malaria	Diffuse cerebral edema with thalamic +/- cerebellar hypo-attenuation	CT	Gonzalez RG		Neurological Infectious disease
Inflammatory abdominal aortic aneurysm (IAAA)	Perianeurysmal fibrosis	CT	Brady T Saini S Waltman A		Inflammatory Cardiology / Vascular
Inflammatory abdominal aortic aneurysm (IAAA)	Aneurysmal wall thickness	CT	Brady T Saini S Waltman A		Inflammatory Cardiology / Vascular
Inflammatory bowel disease (IBD)	Bowel wall thickening	MRI	Hahn P	Tissue FISP pulse sequence	Gastrointestinal Inflammatory
Inflammatory bowel disease (IBD)	Peri-intestinal inflammation	MRI	Hahn P	Tissue FISP pulse sequence	Gastrointestinal Inflammatory
Interstitial pulmonary edema	Increased pulmonary interstitial markings	CT	McCloud T Shepard J		Inflammatory Cardiology / Vascular Infectious Disease
Intra-abdominal abscess	Cyst composition / tissue characterization	US CT MRI	Mueller P		Gastrointestinal Genitourinary Infectious disease
Intracranial arterial dissection	Anatomic disruption of arterial wall	CTA MRA Angiography	Gonzalez R Lev MH Waltman A		Neurological Cardiology / Vascular
Ischemic heart disease	Myocardial blood flow via 13N-ammonia	Nuclear medicine SPECT	Fischman A		Cardiology / Vascular
Joint injury / general	Osteochondral lesions	MR arthrography	Palmer WE	Assesses the stability of lesions	Musculoskeletal
Joint injury / hip and knee	Spatial cartilage thickness	Co-planar MRI	Palmer WE Rosenberg AE Rosenthal DI	MR using fat-saturated 3D spoiled gradient-echo images (SPGR)	Musculoskeletal
Joint injury / hip and knee	Articular cartilage volume	Co-planar MRI	Palmer WE Rosenberg AE Rosenthal DI	MR using fat-saturated 3D spoiled gradient-echo images (SPGR)	Musculoskeletal
Lung neoplasm / non small cell carcinoma	Glucose metabolism	PET	Choi NC Fischman AJ Weissleder R	Pilot trial in NSCLC showed good inverse correlation between MR post radiation and outcomes	Oncology / Neoplasm
Lung neoplasm / primary and secondary	Lesion volume	CT MRI	Hunter GJ	Anatomic marker of disease presence	Oncology / Neoplasm
Lung neoplasm / primary and secondary	Mediastinal nodal status	PET MRI CT	Fischman AJ McCloud TC Weissleder R	Physiologic imaging with FDG or iron oxide particles in NSCLC	Oncology / Neoplasm

Disease

Lymphangio-carcinomatosis	Increased pulmonary interstitial markings	CT	McCloud TC Mueller PR Shepard J Weissleder R		Oncology / Neoplasm
Lymphatic extension of pelvic malignancy (gynecological oncology)	Abnormal lymphatic uptake of tracer	MRI	Hahn PF Harisinghani M Mueller PR Saini S Weissleder R	MR Lymphangiography using ultrasmall superparamagnetic iron oxide	Oncology / Neoplasm Inflammatory
Migraine	Cerebral blood flow (CBF)	Laser speckle contrast imaging Diffuse optical topography	Boas D Bolay Dunn A		Neurological
Migraine	Cerebral blood flow (CBF)	Diffusion / perfusion weighted imaging fMRI	Grant E Schaefer P Sorensen AG Rosen BR		Neurological
Migraine	Cerebral blood volume (CBV)	Diffusion / perfusion weighted imaging fMRI	Grant E Schaefer P Sorensen AG Rosen BR		Neurological
Migraine	Mean transit time (MTT)	Diffusion / perfusion weighted imaging fMRI	Grant E Schaefer P Sorensen AG Rosen BR		Neurological
Migraine	Cortical spreading depression (CSD)	Blood oxygen level dependent (BOLD) fMRI	Hadjikhani N Rosen BR Sorensen AG	Signal changes measured during visual aura	Neurological
Migraine	Restricted diffusion	Optical	Boas D Dunn A		Neurological
Multiple sclerosis	Choline / sodium (NA) ratio Creatine / sodium (NA) ratio	MRS	Jenkins B Gonzalez RG		Neurological Inflammatory
Multiple sclerosis	Comparative brainstem analysis	MRI	Jenkins B Rosen BR Stufflebeam SM		Neurological Inflammatory
Multiple sclerosis	MS plaque demyelination	MRI	Jenkins B Rosen BR Stufflebeam SM		Neurological Inflammatory
Multiple sclerosis	Decreased N-acetylaspartate (NAA)	MRS	Jenkins B Gonzalez RG		Neurological Inflammatory
Multiple sclerosis	Thalamic neuronal loss	MRI fMRI MRS	Gonzalez RG Fischl B Kuperberg G		Neurological Inflammatory
Multiple sclerosis	Tissue characterization	fMRI MRI morphometry	Fischl B Kuperberg G		Neurological Inflammatory
Multiple sclerosis	Cortical thickness	fMRI MRI morphometry	Fischl B Kuperberg G		Neurological Inflammatory
Myocarditis	Myocardial function contractility	MRI	Brady T		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic
Myocarditis	Perfusion / diffusion	MRI	Brady T		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic
Myocarditis	Perfusion / diffusion	Nuclear medicine	Fischman A		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic

Disease

Myocarditis	Myocardial function contractility	Nuclear medicine	Fischman A		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic
Myopathy	Soft tissue inflammation	MRI	Palmer W Rosenthal DI		Endocrine Inflammatory Infectious Disease Cardiology / Vascular
Neoplasm / primary and secondary	Anti-tumor antibody	Optical	Ntziachristos V Weissleder R	Targeted Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Apoptosis Caspase-1 Caspase-3	Optical	Ntziachristos V Weissleder R	Active, stable Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Apoptosis Phosphatidylserin e	Optical	Ntziachristos V Weissleder R	Active, stable Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Cathepsin D	Optical	Ntziachristos V Weissleder R	Active, stable Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Change in local tissue density or contrast enhancement	CT MRI	Palmer WE Rosenthal DI	Multicenter Trail with 367 patients - CT and MRI equally reliable for diagnosis	Musculoskeletal Oncology / Neoplasm
Neoplasm / primary and secondary	Directed molecular probes	MRI PET Optical	Fischman AJ Hunter GJ Weissleder R		Oncology / Neoplasm
Neoplasm / primary and secondary	Enzymatic activity	Optical	Weissleder R	Rodent model	Oncology / Neoplasm
Neoplasm / primary and secondary	Fluorescent proteins / exogenous	Macroscopic fluorescence reflective imagine (FRI) Fluorescence molecular tomography (FMT)	Ntziachristos V Weissleder R	Green fluorescence proteins (GFPs) Ds Red Hc Red	Oncology / Neoplasm
Neoplasm / primary and secondary	Folate receptor	Optical	Ntziachristos V Weissleder R	Targeted Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Glucose transporter	Optical	Ntziachristos V Weissleder R	Targeted Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Human transferrin receptor	MRI	Weissleder R	Receptor binding probe linking transferrin and monocrystalline iron oxide (Tf- MION)	Oncology / Neoplasm
Neoplasm / primary and secondary	Local uptake of specific tumor avid radiotracers	Nuclear medicine	Fischman AJ		Musculoskeletal Oncology / Neoplasm
Neoplasm / primary and secondary	Matrix metalloproteinase- 2 MMP-9 MMP-13	Optical	Ntziachristos V Weissleder R	Active, stable Fluorochromes	Oncology / Neoplasm
Neoplasm / primary and secondary	Pharmacokinetics Biodistribution Non-tumor uptake	SPECT PET MRS	Fischman AJ Jenkins B	Additional use for determining in vivo heterogeneity of tumor uptake	Oncology / Neoplasm
Neoplasm / primary and secondary	Soft tissue inflammation	Nuclear medicine MRI	Fischman AJ Palmer WE Rosenthal DI		Oncology / Neoplasm
Neoplasm / primary and secondary	Somatostatin receptor	Optical	Ntziachristos V Weissleder R	Targeted Fluorochromes	Oncology / Neoplasm

Disease

Neoplasm / primary and secondary	Tumor angiogenesis	MRI Dynamic susceptibility contrast (DSC) / monocrySTALLINE iron oxide nanoparticles (MION)	Bogdanov A Bremer C Rosen BR Weissleder R	High resolution MR using long circulating iron oxide contrast agents Rodent model	Oncology / Neoplasm
Neoplasm / primary and secondary	Tumor angiogenesis Macromolecular contrast extravasate	MRI SPECT	Bogdanov A Weissleder R	Animal model using pegylated DOTA derivatized graft copolymers	Oncology / Neoplasm
Neoplasm / primary and secondary	Tumor growth rate	MRI SPECT Dual tracer NMR	Bogdanov A Kwong K Weissleder R	SPECT via uptake of long-circulating dextrin coated iron oxide (LCDIO) Rodent model	Oncology / Neoplasm
Neoplasm / primary and secondary	Tumor mass	Optical	Weissleder R		Oncology / Neoplasm
Neoplasm / primary and secondary	Tumoral proteinase	Optical Near infrared spectroscopy	Bogdanov A Mahmood U Weissleder R	Rodent model	Oncology / Neoplasm
Neurodegenerative disorders	Apparent diffusion constant (ADC)	fMRI MRI / diffusion weighted imaging	Jenkins BG Kennedy D Rosas HD Rosen B		Neurological
Neurodegenerative disorders	Blood oxygen level depletion	fMRI MRI / diffusion weighted imaging	Jenkins BG Kennedy D Rosas HD Rosen B		Neurological
Obesity	Body fat composition	Quantitative CT MRI US	Rosenthal DI		Endocrine Metabolic Musculoskeletal Gastrointestinal
Obsessive compulsive disorder	Cortical activation during provoked conditions	fMRI PET SPECT	Fischman A Rauch SL Rosen BR		Neurological
Obsessive compulsive disorder	Cortical thickness	MRI (morphometry)	Kennedy D		Neurological
Obsessive compulsive disorder	Whole brain morphometry	MRI (morphometry)	Kennedy D Rosen BR	Findings include sig. less total white-matter and greater cortex and opercular volumes	Neurological
Osseous neoplasm / primary and secondary	Glucose metabolism	PET	Fischman AJ		Oncology / Neoplasm Musculoskeletal
Osseous neoplasm / primary and secondary	Osteoblastic activity	Nuclear medicine	Fischman A		Oncology / Neoplasm Musculoskeletal
Osseous neoplasm / primary and secondary	Tissue characterization	CT MRI	Rosenthal DI		Oncology / Neoplasm Musculoskeletal
Osteoarthritis	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Osteoarthritis	Cartilage thickness	Intra-articular Optical coherence topography	Palmer WE		Musculoskeletal Inflammatory
Osteoarthritis	Fibrillations	Intra-articular Optical coherence topography	Palmer WE		Musculoskeletal Inflammatory
Osteoarthritis	Fibrosis	Intra-articular Optical coherence topography	Palmer WE		Musculoskeletal Inflammatory
Osteoarthritis	Osteoblastic activity	Nuclear medicine	Fischman AJ		Musculoskeletal Inflammatory

Disease

Osteoarticular allograft imaging	Increasing periosteal and endosteal enhancement	MRI	Palmer WE Rosenthal DI	3-4 months post allograft / represents vascular ingrowth and early skeletal repair	Musculoskeletal
Osteomyelitis	Leukocyte accumulation	Nuclear medicine	Fischman AJ	Radiolabeled IL-8 accumulation	Infectious disease Musculoskeletal
Osteomyelitis	Osteoblastic activity	Nuclear medicine	Fischman AJ	Uptake of bone-seeking radio-pharmaceuticals	Musculoskeletal Infectious disease
Osteopenia	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) CT	Rosenthal DI	Must establish bone strength as well as density	Endocrine Metabolic Musculoskeletal
Osteoporosis	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) CT	Rosenthal DI	Must establish bone strength as well as density	Endocrine Metabolic Musculoskeletal
Osteoporosis	Microarchitecture deterioration	Digital radiographs 3D microMRI 3D microCT	Rosenthal DI	Fine element modeling (FEM) to predict mechanical properties	Musculoskeletal Metabolic
Osteoporosis	Micro-architecture deterioration	Digital radiographs 3D microMRI 3D microCT	Rosenthal DI	Fine element modeling (FEM) to predict mechanical properties	Musculoskeletal Metabolic
Osteoporosis	Trabecular pore size	MRI	Rosenthal DI		Musculoskeletal Metabolic
Ovarian neoplasm / presence and viability	Glucose metabolism	PET	Fischman AJ	Non-specific marker with wide variety of applications	Oncology / Neoplasm Genitourinary
Ovarian neoplasm / presence and viability	ROC curve analysis of 13 CT radiographic parameters	CT	O'Neill MJ	Predictive model of relative success of surgical cytoreduction	Oncology / Neoplasm Genitourinary
Pain	Cortical activity	fMRI PET SPECT MEG	Fischman A Halgren E Rosen B Sorensen AG Stuffelbeam SM		Neurological Musculoskeletal
Pancreatic adrenal carcinoma	Degree of circumferential vessel involvement	Multidetector CT angiography (MDCT) / CTA	Boland GW Mueller PR Saini S		Oncology / Neoplasm Gastrointestinal
Pancreatic carcinoma	18 F-fluorodeoxy-glucose	PET	Fischman AJ		Oncology / Neoplasm Gastrointestinal
Pancreatic carcinoma	Vascular involvement	MRA	Halpern EF Saini S Waltman AC	Better predictor than conventional angiography	Oncology / Neoplasm Gastrointestinal
Pancreatic carcinoma	Portal Venous invasion	MRA	Halpern EF Saini S Waltman AC	Better predictor than conventional angiography	Oncology / Neoplasm Gastrointestinal
Pancreatic function	Acinar cell receptor binding	MRI	Brady TJ Shen TT Weissleder R	Secretin monocrySTALLINE iron oxide nanoparticles (MION)	Endocrine Metabolic Gastrointestinal
Pancreatic mass	Contrast enhanced tissue characterization	MRI cholangio - pancreatography	Prasad S Sahani D Saini S		Oncology / Neoplasm Gastrointestinal
Pancreatitis	Chemotactic peptide uptake	SPECT	Fischman AJ	Via 99mTc labeled peptide analog	Gastrointestinal Inflammatory Metabolic Infectious disease Endocrine

Disease

Pancreatitis	Ductal irregularity or obstruction	MRI	Prasad S Sahani D Saini S	Visualized by MR cholangio-pancreatography (MRCP)	Gastrointestinal Inflammatory Metabolic Infectious disease Endocrine
Parkinson's disease	Cerebral blood volume (CBV)	MRI / Arterial spin labeling	Hoge R		Neurological
Parkinson's disease	Cerebral blood flow (CBF)	MRI / Arterial spin labeling	Hoge R		Neurological
Parkinson's disease	Directed molecular probes	PET Optical	Weissleder R		Neurological
Parkinson's disease	Dopamine transporter (DAT) density	SPECT (using I-123 altropane)	Fischman A Halpern E Sahani D		Neurological
Parkinson's disease	Dopamine binding potential	SPECT (using I-123 altropane)	Fischman A Halpern E Sahani D		Neurological
Parkinson's disease	Dopaminergic neurotransmitter activity	fMRI PET	Fishman A Livni E Rosen B	Pet using 11C-CRT	Neurological
Parkinson's disease	N-acetylaspartate (NAA) levels over time	MRS	Gonzales RG Jenkins BG		Neurological
Pigmented villonodular synovitis	Increased synovial glucose metabolism	PET	Fischman AJ Palmer W Rosenthal DI		Inflammatory Musculoskeletal
Pigmented villonodular synovitis	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Inflammatory Musculoskeletal
Pigmented villonodular synovitis	Synovial thickening	MRI	Palmer W Rosenthal DI		Musculoskeletal Oncology / Neoplasm
Pneumonitis	Pulmonary consolidation	CT MRI Plain radiographs	McCloud TC Shepard J		Infectious disease Inflammatory
Pneumonitis	Pulmonary consolidation	CT MRI	McCloud TC Shepard J		Infectious disease Inflammatory
Portal vein thrombosis	Intravascular thrombus	US CT MRI Angiography	Hahn P Mueller P O'Neill MJ Waltman A		Cardiology / Vascular Gastrointestinal
Prostate cancer	Prostate volume	US CT MRI	Hahn PF Mueller PR O'Neill MJ		Oncology / Neoplasm Genitourinary
Prostate cancer	Prostate-specific antigens (PSA)	Optical	Ntziachristos V Weissleder R	Active, stable Fluorochromes	Oncology / Neoplasm
Prostate cancer	Spermine levels	MRS magic angle spinning	Cheng LL Gonzalez RG	Proposed endogenous inhibitor of prostate CA growth	Oncology / Neoplasm Genitourinary
Pulmonary embolism	Embolism volume	MRI	Weissleder R	Via monocryalline iron oxide nanoparticles (MION)	Cardiology / Vascular
Pulmonary embolism	Intravascular thrombus	CT	McCloud T		Cardiology / Vascular
Pulmonary embolism	Ventilation / perfusion mismatch	Nuclear medicine	Fischman A		Cardiology / Vascular
Pulmonary infection	Increased pulmonary interstitial markings	CT	McCloud TC Shepard J		Infectious disease
Pulmonary neoplasm	Permeability surface area product	PET MRI	Fischman AJ McCloud TC		Oncology / Neoplasm

Disease

Pulmonary neoplasm / presence and viability	Glucose metabolism	PET	Fischman AJ	Non-specific marker with wide variety of applications	Oncology / Neoplasm
Rectal carcinoma / advanced staging	Infiltration of tunica muscularis Presence of positive nodes	MRI Multidetector CT angiography (MDCT) US	Hahn P Saini S O'Neill MJ Mueller P		Gastrointestinal Oncology / Neoplasm
Rectal carcinoma / recurrent	Peri-rectal fat involvement	MRI	Hahn P Prasad S Saini S	Predictor of high probability of local recurrence	Gastrointestinal Oncology / Neoplasm
Rectal carcinoma / recurrent	Spiculated lymph node	MRI	Hahn P Prasad S Saini S	Predictor of high probability of local recurrence	Gastrointestinal Oncology / Neoplasm
Renal disease	Decreased regional blood flow	PET	Alpert NM Fischman AJ		Metabolic Endocrine
Renal disease	Hippuran clearance	PET	Alpert NM Fischman AJ		Metabolic Endocrine
Renal neoplasm / primary and secondary	Cyst composition / tissue characterization	US CT MRI	Mueller PR		Oncology / Neoplasm Genitourinary
Renal neoplasm / primary and secondary	Glucose metabolism	PET	Fischman AJ		Oncology / Neoplasm Genitourinary
Renal neoplasm / primary and secondary	Lesion volume	US CT MRI	Mueller PR O'Neill MJ Saini S	Anatomic marker of disease presence	Oncology / Neoplasm Genitourinary
Respiratory syncytial virus	Ground-glass appearance	CT	McLoud TC Shepard J		Infectious disease
Respiratory syncytial virus	Acute bronchial dilatation Wall thickening	CT	McLoud TC Shepard J		Infectious disease
Respiratory syncytial virus	Opacities	CT	McLoud TC Shepard J		Infectious disease
Rotator cuff injury	Distribution and leakage of intra-articular administered contrast media	MR arthrography	Palmer WE	Distinguishes full from partial thickness tears	Musculoskeletal
Sarcoma	Vascular volume fraction	Optical	Weissleder R		Oncology / Neoplasm
Schizophrenia	Cerebral blood flow (CBF)	PET	Alpert N Fischman A Heckers S Rauch SL Schaefer P	Regional activation during cognitive paradigms	Neurological
Schizophrenia	Neural activation of dorsolateral pre-frontal cortex, hippocampus and cerebellum	PET	Alpert N Fischman A Heckers S Rauch SL Schaefer P	Regional activation during cognitive paradigms	Neurological
Schizophrenia	Cortical thickness	MRI (morphometry)	Fischl B Harris G Kennedy D Kuperberg G		Neurological
Schizophrenia	Specific regional uptake, target selection and functional activation	fMRI	Kuperberg G Manoach D Stufflebeam SM Rosen B	Regional activation during cognitive paradigms	Neurological
Simple renal cysts	Cyst composition / tissue characterization Soft tissue inflammation	US CT MRI	Mueller PR		Oncology / Neoplasm Genitourinary
Simple renal cysts	Soft tissue inflammation	US CT MRI	Mueller PR		Oncology / Neoplasm Genitourinary

Disease

Skeletal muscle injury and repair	Musculoskeletal blood flow	PET	Alpert NM Fischman AJ	Animal study Use of H <sub>2</sub> (15)O to study muscle metabolism	Musculoskeletal
SLAP lesions of the shoulder	Articular labrum fraying	MR arthrography	Bencardino JT Palmer WE		Musculoskeletal
SLAP lesions of the shoulder	Bicep anchor avulsion	MR arthrography	Bencardino JT Palmer WE		Musculoskeletal
Soft tissue infection	Leukocyte accumulation	Nuclear medicine	Fischman AJ		Infectious disease Musculoskeletal Inflammatory
Soft tissue infection	Osteoblastic activity	Nuclear medicine	Fischman AJ		Infectious disease Musculoskeletal Inflammatory
Soft tissue infection	Soft tissue inflammation	MRI Nuclear medicine	Fischman AJ Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Soft tissue neoplasm / primary and secondary	Glucose metabolism	PET	Fischman AJ	Non-specific marker with wide variety of applications	Oncology / Neoplasm Musculoskeletal
Splenic cysts	Splenic tissue characterization	MRI	Hahn PF Harisinghani M Mueller PR Weissleder R	Using ultrasmall superpara-magnetic iron oxide	Oncology / Neoplasm Gastrointestinal
Splenic neoplasm	Splenic tissue characterization	MRI	Hahn PF Harisinghani M Mueller PR Weissleder R	Using ultrasmall superpara-magnetic iron oxide	Oncology / Neoplasm Gastrointestinal
Splenic trauma	Splenic tissue characterization	MRI	Harisinghani M Weissleder R	Using ultrasmall superpara-magnetic iron oxide	Gastrointestinal Cardiology / Vascular
Stroke	Apparent diffusion constant (ADC)	Diffusion weighted imaging fMRI MRI (morphometry)	Kennedy D Lo E Rosen B		Neurological Cardiology / Vascular
Stroke	Relative cerebral blood flow index (rCBF)	Diffusion weighted imaging fMRI MRI (morphometry)	Kennedy D Lo E Rosen B		Neurological Cardiology / Vascular
Stroke	Cerebral blood flow (CBF)	MRI (combined Arterial spin labeling and Dynamic susceptibility contrast) CAPTIVE	Harris G Hoge R Ostergaard L Rosen B Sorensen AG Wald LL	MTT helps to stratify patients in clinical trials MR perfusion territory imaging	Neurological Cardiology / Vascular
Stroke	Cerebral blood volume (CBV)	MRI (combined Arterial spin labeling and Dynamic susceptibility contrast) CAPTIVE	Harris G Hoge R Ostergaard L Rosen B Sorensen AG Wald LL	MTT helps to stratify patients in clinical trials MR perfusion territory imaging	Neurological Cardiology / Vascular
Stroke	Mean transit time (MTT)	MRI (combined Arterial spin labeling and Dynamic susceptibility contrast) CAPTIVE	Harris G Hoge R Ostergaard L Rosen B Sorensen AG Wald LL	MTT helps to stratify patients in clinical trials MR perfusion territory imaging	Neurological Cardiology / Vascular
Stroke	Flow heterogeneity (FH)	MRI (combined Arterial spin labeling and Dynamic susceptibility contrast) CAPTIVE	Harris G Hoge R Ostergaard L Rosen B Sorensen AG Wald LL	MTT helps to stratify patients in clinical trials MR perfusion territory imaging	Neurological Cardiology / Vascular
Stroke	Intravascular thrombus	CT / CTA MRI / MRA Angiography	Caviness VS Gonzalez RG Schaefer P Sorensen AG		Neurological Cardiology / Vascular

Disease

Stroke	Neuronal activation CMRO2	Arterial spin labeling MRI O2 15 PET Xenon Enhanced CT	Wald LL		Neurological Cardiology / Vascular
Stroke	Neuronal activation	fMRI Diffuse optical topography (Near infrared spectroscopy)	Boas D Mandeville JB Strangman G	NIRS agrees well with fMRI, useful in longitudinal studies	Neurological Cardiology / Vascular
Stroke	CMRO2	fMRI Diffuse optical topography (Near infrared spectroscopy)	Boas D Mandeville JB Strangman G	NIRS agrees well with fMRI, useful in longitudinal studies	Neurological Cardiology / Vascular
Stroke	Oxygen consumption	Optical imaging	Boas, D Dunn, A Lo E		Neurological Cardiology / Vascular
Stroke	Cerebral Blood flow (CBF)	Optical imaging	Boas, D Dunn, A Lo E		Neurological Cardiology / Vascular
Stroke / ischemic	Cerebral blood flow (CBF)	CAPTIVE MRI	Bogdanov A Jenkins B Kwong K Weissleder R		Neurological Cardiology / Vascular
Stroke / ischemic	Relative cerebral blood volume (rCBV)	CAPTIVE MRI	Bogdanov A Jenkins B Kwong K Weissleder R		Neurological Cardiology / Vascular
Stroke / ischemic	Water EF	CAPTIVE MRI	Bogdanov A Jenkins B Kwong K Weissleder R		Neurological Cardiology / Vascular
Stroke / ischemic	Vascular occlusion	Diffusion / perfusion weighted imaging MRI CT perfusion CTA	Gonzalez R Harris G Sorensen AG		Neurological Cardiology / Vascular
Stroke / ischemic	Ischemic brain tissue	Diffusion / perfusion weighted imaging MRI CT perfusion CTA	Gonzalez R Harris G Sorensen AG		Neurological Cardiology / Vascular
Stroke / recovery	Cortical activation during sensorimotor tasks	fMRI	Schaechter J Rosen BR		Neurological Cardiology / Vascular
Synovial cell sarcoma	Cyst composition / tissue characterization	US CT MRI	Rosenthal DI		Oncology / Neoplasm Musculoskeletal
Synovial chondromatosis	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Oncology / Neoplasm
Synovial cyst	Cystic architecture / tissue characterization	US CT MRI	Palmer W Rosenthal DI		Musculoskeletal
Thyroid carcinoma	Cystic nodal metastases	US	Hahn PF Harisinghani M Mueller PR O'Neill MJ		Oncology / Neoplasm Endocrine
Trauma	Edema / change in signal intensity and apparent diffusion constant	MRI Diffusion weighted imaging	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Trauma	Soft tissue inflammation	MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Trauma	Soft tissue inflammation	Nuclear medicine	Fischman AJ		Musculoskeletal Inflammatory
Trauma	Soft tissue uptake of radiotracers	Nuclear medicine	Fischman AJ		Musculoskeletal Inflammatory

## Disease

Visual process disorders	Neuronal activation	fMRI	Mandeville JB Rosen B Tootell RBH		Neurological
Vulnerable plaque	Atherosclerotic plaque temperature	Thermography	Brady T Lev M Waltman A		Neurological Cardiology/ Vascular Inflammatory
Vulnerable plaque	Macrophage content	Optical coherence topography	Weissleder R		Neurological Cardiology / Vascular Inflammatory
Vulnerable plaque	Fibrous cap thickness	Optical coherence topography	Weissleder R		Neurological Cardiology / Vascular Inflammatory
Vulnerable plaque	Plaque Type	Optical coherence topography	Weissleder R		Neurological Cardiology / Vascular Inflammatory
Vulnerable plaque	Subendothelial lipid pool	Optical coherence topography Near infrared spectroscopy	Brady T Muller J		Neurological Cardiology / Vascular
Vulnerable plaque	Targeted microbubble contrast agents	Contrast enhanced US	O'Neill MJ Waltman A		Neurological Cardiology / Vascular Inflammatory
Vulnerable plaque	Thickness and composition of plaque	Intravascular US IVUS	Brady T Lev M O'Neill NJ Waltman A		Neurological Cardiology / Vascular Inflammatory

\*Given the breadth of biomarkers in imaging and the rapid progress being made in this area, this catalog necessarily represents a work in progress. While the Center has done its best to incorporate imaging biomarkers from beyond the MGH community, our limited resources mean that the foundation of this catalog is the imaging biomarkers available at MGH. Should you wish to bring additional imaging biomarkers to our attention, please [click here](#).