

Metabolic

Disease / Medical condition	Biomarker	Imaging Technique	Investigators	Comments	Disease Category
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	McCloud TC Shepard J		Endocrine Metabolic Inflammatory
Alzheimer's disease	Cerebral blood flow	Perfusion weighted imaging / Arterial spin labeling	Hoge R		Neurological Metabolic
Alzheimer's disease	Cerebral blood flow (CBF) Cerebral blood volume (CBV) 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 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
Alzheimer's disease	Myoinositol 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 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
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

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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, 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 Cerebral blood flow (CBF)	Optical Imaging	Boas D Dunn A		Neurological Metabolic
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	rCMRO2 Cerebral blood volume (CBV)	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) relative cerebral blood volume (rCBV)	Pharmacologic MRI PET fMRI	Bogdanov M Chen YC Jenkins B Rosen B	Using D-amphetamine and CFT	Neurological Metabolic
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
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
Diabetes	Directed molecular probes for beta cell mass	MRI	Moore A Bogdanov A Weissleder R		Metabolic Endocrine
Myocarditis	Myocardial function contractility Perfusion / diffusion	MRI	Brady T		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic
Myocarditis	Myocardial function contractility Perfusion / diffusion	Nuclear medicine	Fischman A		Cardiology / Vascular Inflammatory Infectious disease Endocrine Metabolic
Obesity	Body fat composition	Quantitative CT MRI US	Rosenthal DI		Endocrine Metabolic Musculoskeletal Gastrointestinal

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Osteopenia	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) MRI Quantitative CT	Rosenthal DI	Must establish bone strength as well as density	Musculoskeletal Metabolic
Osteoporosis	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) MRI Quantitative CT	Rosenthal DI	Must establish bone strength as well as density	Musculoskeletal Metabolic
Osteoporosis	Microarchitecture 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
Pancreatic function	Acinar cell receptor binding	MRI	Brady TJ Shen TT Weissleder R	Secretin monocrySTALLINE iron oxide nanoparticles (MION)	Endocrine Metabolic Gastrointestinal
Pancreatitis	Chemotactic peptide uptake	SPECT	Fischman AJ	Via 99mTc labeled peptide analog	Gastrointestinal Inflammatory Metabolic Infectious disease Endocrine
Pancreatitis	Ductal irregularity or obstruction	MRI	Sahani D Prasad S	Visualized by MR cholangio-pancreatography	Gastrointestinal Inflammatory Metabolic Infectious disease Endocrine
Renal Disease	Decreased regional blood flow Hippuran clearance	PET	Alpert NM Fischman AJ		Metabolic Endocrine