

**PENALTY**

**Note: a majority of the subsequent history of the cases has been omitted as unnecessary for purposes of this appendix.**

<b>Case name and citation</b>	<b>Brain scan</b>	<b>Defendant's claim</b>	<b>Outcome: Was Claim Successful or Unsuccessful?</b>
Allen v. Hickman, 407 F. Supp. 2d 1098, 1101, 1105–06 (N.D. Cal. 2005).	No scans performed. Requested MRI, SPECT	A forensic psychologist recommended defendant receive the SPECT test and MRI to investigate defendant's potential brain damage. Defendant wanted MRI and SPECT procedures because the results could serve as a mitigating factor in his clemency proceeding	Unsuccessful. Request to have MRI and SPECT scans denied.
Allen v. State, 137 So. 3d 946, 954, 960–62 (Fla. 2013) (per curiam).	PET	Neuropsychiatric expert witness claimed PET scan revealed brain damage that contributed to defendant's poor impulse control. Petitioner claimed prosecutorial misconduct because the prosecutor asked repeated questions of the witness that implied the brain damage would lead to future dangerousness.	Unsuccessful. The prosecution only asked two questions on defendant's future dangerousness in "isolated portion[s] of the penalty phase," and the prosecution did not advance the argument of future dangerousness based on brain scan evidence in closing arguments. Therefore, the State did not deprive petitioner of a fair penalty phase.
Apelt v. Ryan, No. CV-98-00882-PHX-ROS, 2015 WL 5119670, at *6, *21–24 (D. Ariz. Sept. 1, 2015).	EEG, MRI	Claimed that defendant's diminished intelligence made him ineligible for the death penalty under <i>Atkins</i> .	Court held there was no convincing evidence, including from EEG and MRI, that defendant had organic brain damage or diminished IQ.
Ault v. State, 53 So. 3d 175, 189–90, 195–96 (Fla. 2010) (per curiam).	EEG, PET	Claimed trial court erred in rejecting brain damage that was evidenced by objective scans as a mitigating factor in sentencing.	Partially successful. Trial court erred in rejecting mitigating brain scan evidence; however, this was deemed a "harmless error." Death sentence was affirmed.
Black v. Bell, 664 F.3d 81, 88, 100–01 (6th Cir. 2011).	MRI, PET	Brain scan evidence used to support post-conviction <i>Atkins</i> hearing for	Successful. Remanded to trial court for further hearings.

RECONSIDERATION ON REMAND: Black v. Colson, No. 3:00-0764, 2013 WL 230664, at *19 (M.D. Tenn. Jan. 22, 2013).		mental retardation. Rejected by trial court and then reconsidered by court of appeals.	RECONSIDERATION ON REMAND: <i>Atkins</i> petition denied.
Bible v. Schriro, 497 F. Supp. 2d 991, 1054, 1060 (D. Ariz. 2007).	No scans performed.	Claimed IAC claim for failing to pursue brain scans of defendant. Defense expert testified that brain scans would have shown organic brain damage due to defendant's chronic substance abuse.	Unsuccessful. Counsel not deemed ineffective for not pursuing brain scans of defendant.
Bonin v. Calderon, 59 F.3d 815, 829, 836 (9th Cir. 1995).	MRI, EEG	Claimed IAC for failing to present both the childhood mitigating evidence and the evidence of brain damage to the jury.	Unsuccessful. Counsel not ineffective for failing to present evidence of brain damage as mitigating evidence during penalty phase.
Bright v. State, 455 S.E.2d 37, 49–51 (Ga. 1995).	Requested EEG/CAT	Requested public funds to obtain scans to establish insanity defense during guilt phase and mitigating evidence during penalty phase. Trial court refused.	Partially successful. Trial court did not err in refusing funds during guilt phase but did err in refusing funds during penalty phase. Error was harmful; death sentence reversed.
Bryan v. Mullin, 335 F.3d 1207, 1217–24 (10th Cir. 2003); <i>id.</i> at 1239 (Henry, J., concurring in part and dissenting in part).	CAT, SPECT	Claimed IAC for failing to present results of brain scans or defendant's mental disorders in the mitigation stage.	Unsuccessful. Counsel not ineffective for choosing not to introduce brain scan evidence in mitigation stage. "[T]he majority concludes that Mr. Freeman's choice not to present the mental health history at the sentencing stage was reasonable, given his fear of the evidence acting as a two-edged sword."
Byram v. Ozmint, 339 F.3d 203, 209–11 (4th Cir. 2003).	MRI, EEG	Claimed IAC for failing to present brain scan evidence during guilt phase of trial.	Unsuccessful. Counsel's decision was strategic, as evidence had as much

			potential to harm defendant as to help him.
Card v. McNeil, 2010 No. 4:08-cv-448-SPM, 2010 WL 4945419, at *8–11 (N.D. Fla. Nov. 23, 2010).	MRI, EEG	Claimed IAC for failing to obtain PET and failing to hire an expert competent to review psychological and medical records.	Unsuccessful. MRI and EEG were negative, so there was no apparent need for PET. Expert witness was qualified for the purpose of humanizing defendant.
Carter v. Chappell, No. 06cv1343 BEN (KSC), 2013 WL 1120657, *89–94 (S.D. Cal. Mar. 18, 2013).	PET	Claimed IAC for failing to present PET scan evidence of mitigating brain damage and fetal alcohol syndrome.	Unsuccessful. Trial counsel conducted extensive investigation of defendant's mental state. His choice not to present that evidence was reasonable.
Chaney v. Stewart, 156 F.3d 921, 923–24, 925–26 (9th Cir. 1998).	CAT, EEG, Requested PEG	Claimed trial court erred in refusing to appoint a temporal lobe epilepsy specialist to interpret scan results and perform specialized PEG test during guilt and penalty phases of trial.	Unsuccessful. Death penalty affirmed, though the appellate court did find it “troubling” that trial court refused to appoint requested expert during penalty phase.
Cole v. Branker, No. 5:05-HC-461-D, 2007 WL 2782327, at *15–18 (E.D.N.C. Sept. 20, 2007).	Requested MRI, PET, EEG	Claimed IAC because counsel failed to seek funds for brain scans during guilt and penalty phases of trial.	Unsuccessful. Petitioner was evaluated by neuropsychologists during trial, who determined further testing was not required.
Cole v. State, 164 P.3d 1089, 1093–94, 1102 (Okla. Crim. App. 2007).	MRI	Requested a continuance to have an expert review an MRI in order to develop alleged mitigating evidence.	Unsuccessful. Court denied a continuance for defendant to have an expert review the results of his MRI test that allegedly revealed abnormalities. The request was denied because defendant had ample time to have the test reviewed. The results would have been cumulative because the fact the defendant had brain damage was presented and considered as mitigating evidence.

Commonwealth v. Robinson, 82 A.3d 998, 1012–17 (Pa. 2013).	No scans performed.	Claimed IAC for counsel’s failure to notify expert witness of petitioner’s documented low IQ score. Petitioner claimed brain scans may have revealed potentially mitigating evidence of brain damage.	Unsuccessful. Petitioner’s low IQ was used as a mitigating factor at trial, and the jury still returned three death sentences. The evidence would only have been used to support the theory and was open to attack by prosecution. Moreover, brain scan technology was not widely available at the time of trial. Therefore, counsel’s actions were reasonable.
Consulate Gen. of Mex. v. Phillips, 17 F. Supp. 2d 1318, 1326–27 (S.D. Fla. 1998).	Requested PET	Requested PET scan to provide evidence of organic brain disorder for use in the guilt and penalty phases.	Unsuccessful. No PET scan performed. Defendant failed to satisfy the requirements under Florida law that would have allowed the court to grant the PET scan or “any other procedure.”
Crawford v. Epps, No. 3:04CV59-SA, 2008 WL 4419347, at *47, *50 (N.D. Miss. Sept. 25, 2008) <i>vacated in part</i> , 353 F. App’x 977 (5th Cir. 2009).	EEG	Claimed IAC in penalty phase, specifically failure to investigate and present mitigating evidence. Petitioner claimed it was never revealed at trial that he might have organic brain damage as a result of an accident that occurred when he was a teenager.	Unsuccessful. The court found there was no indication that petitioner suffered from organic brain damage. In his report, the expert merely opined, without having evaluated petitioner, that his seizures “could possibly be caused by organic brain damage resulting from a severe head injury he suffered in his late teens” but an EEG would need to be performed. An EEG was performed on petitioner on May 4, 1993, and those results were normal.
Davie v. Mitchell, 291 F. Supp. 2d 573, 612–13 (N.D. Ohio 2003).	Requested CAT, MRI	Claimed trial judge should have ordered MRI and CAT during penalty phase to provide mitigating evidence.	Unsuccessful. Petitioner’s own experts did not recommend use of the tests; therefore, judge’s failure to provide tests was reasonable.



Davis v. State, 742 So. 2d 233, 236–38 (Fla. 1999) (per curiam).	Requested PET	Claimed trial court erred in denying his claim that newly discovered evidence not available at the time of his trial established the need for a PET scan to determine whether defendant had a seizure disorder and an evidentiary hearing to determine if the PET scan results could have affected his conviction and sentence.	Unsuccessful. Trial court’s denial of defendant’s claim affirmed. The court explained that the defendant’s request for a PET scan was unsupported and therefore speculative, and defendant’s claim was meritless because there was no reasonable likelihood the outcome of the trial would have been different. The claim was procedurally barred because it could have been raised in an earlier post-conviction motion.
Dickens v. Ryan, 740 F.3d 1302, 1309–10, 1316–17 (9th Cir. 2014) (en banc); <i>id.</i> at 1332–37 (Callahan, J., concurring in part and dissenting in part).	EEG, CAT	Claimed IAC for counsel’s failure to search for additional evidence of organic brain damage due to fetal alcohol syndrome.	Partially successful. Remanded to determine whether defendant could show cause and prejudice to overcome procedural bar. The concurring and dissenting opinions noted counsel’s expert found no signs of brain damage on EEG and CAT and therefore decided not to pursue additional tests. Moreover, additional tests such as MRI were not widely available at the time of trial.
Duffey v. Beard, No. 3:94-cv-1947, 2011 WL 4401681, at *13–14, *15 (M.D. Pa. Sept. 12, 2011).	CAT, EEG	Claimed IAC for failing to counter prosecution’s claim that “normal” CAT and EEG scans demonstrated defendant did not suffer from organic brain damage. Counsel also failed to present evidence that defendant was medicated with anti-seizure medication during the EEG test.	Unsuccessful. Counsel consulted with defense experts who agreed with his trial strategy. Therefore, the strategy was not unreasonable.
Edwards v. Ayers, 542 F.3d 759, 775–76 (9th Cir. 2008).	CAT	Claimed IAC for in failing to argue mental state mitigation during the penalty phase.	Unsuccessful. The evidence could have been a double-edge sword. Trial counsel consulted with at least four mental health experts who found

			no evidence of brain damage. The rest of defendant's troubled history was "highly aggravating in its own right and would open the door to even more damaging evidence."
Evans v. State, 995 So. 2d 933, 949–50 (Fla. 2008) (per curiam).	EEG (performed after trial)	Claimed IAC in penalty phase for failing to present mitigating evidence, specifically expert testimony as to defendant's mental and emotional deficiencies.	Unsuccessful. Counsel was not ineffective for not obtaining brain scan tests and instead presenting mitigating evidence through lay witnesses. Mental health experts would not testify that defendant suffered "extreme" mental or emotional disturbance at the time of the crime, and trial court had already given moderate weight to defendant's cognitive impairments as nonstatutory mitigating factors. "Despite the fact that [defendant] has now found more favorable experts to testify to additional mitigation, our confidence in the outcome is not undermined because the testimony adduced at the evidentiary hearing may not have supported any of the statutory mitigators."
<i>Ex parte</i> Jennings, Nos. AP-75806, AP-75807, 2008 WL 5049911, at *3–7 (Tex. Crim. App. Nov. 26, 2008).	EEG, SPECT	Claimed IAC after trial counsel did not obtain brain scans during penalty phase. Habeas counsel conducted scans that showed evidence of frontal and temporal brain impairment.	Unsuccessful. Not sufficiently likely that a jury would have been persuaded to recommend a sentence less than death with mitigating evidence.
Ferrell v. State, 918 So. 2d 163, 176 (Fla. 2005) (per curiam).	PET, SPECT	Claimed IAC because trial counsel failed to present medical evidence of brain damage.	Unsuccessful. Defendant failed to establish particularized need for a specific type of brain scan. "While the scan would have confirmed the

			experts' diagnoses, it was not necessary in formulating their medical opinions about his brain damage. . . . The scan would not have provided any additional information . . . ."
Flake v. State, No. W2010-00215-CCA-R3-PC, 2011 WL 300213, at *3-5 (Tenn. Crim. App. Jan. 21, 2011).	Requested MRI, PET	Claimed IAC during post-conviction hearing after counsel failed to request PET and MRI tests.	Unsuccessful. Petitioner failed to show a need for the scans and therefore failed to meet his burden.
Forrest v. Steele, No. 09-8002-CV-W-ODS, 2012 WL 16683858, at *3-4 (W.D. Mo. May 11, 2012),  <i>aff'd</i> , 764 F.3d 848, 855 (8th Cir. 2014).	Requested PET	Claimed IAC after trial counsel failed to obtain a PET scan to establish mitigating evidence of brain damage at sentencing.	Unsuccessful. Counsel's failure to obtain PET scan was strategic because negative results could have hurt defendant's case.  Eighth Circuit Court of Appeals affirmed the denial of IAC claim for failure to obtain PET scan prior to trial. Defense counsel's decision was found to be "considered and strategic."
Fulks v. United States, 875 F. Supp. 2d 535, 555-61 (D.S.C. 2010), <i>order clarified by</i> Nos. 4:09-70072-JFA, 4:02-992-JFA, 2010 WL 8987255 (D.S.C. Aug. 25, 2010)..	EEG, CAT, PET	Claimed IAC after trial counsel presented brain scan evidence during penalty phase of trial but failed to call additional psychologists as expert witnesses.	Unsuccessful. Counsel's choice to rely on hard evidence presented in brain scans was strategic, and calling additional expert witnesses could have opened doors to damaging evidence.
Gallego v. State, 23 P.3d 227, 242 (Nev. 2001) (en banc), <i>abrogated by</i> Nunnery v. State, 263 P.3d 235 (Nev. 2011) (en banc).	CAT scan already performed, requested MRI, PET	Defense expert testified CAT scan results indicated significant damage to defendant's brain. Defendant wanted additional neurological testing.	Unsuccessful. Court found additional testing unwarranted. Defendant already had an expert testify as to his brain damage.

Geren v. Cate, No. 2:05-cv-01344-JKS-GGH, 2012 WL 345926, at *3–4, *12, *23–24 (E.D. Cal. Feb. 1, 2012).	MRI performed, requested BEAM, PET	Claimed IAC after trial counsel failed to conduct scans to test for temporal lobe epilepsy. Trial court denied request for funds.	Unsuccessful. Trial court’s refusal to grant funds was not an exhibition of bias. Counsel’s failure to obtain scans was not unreasonable.
Gissendaner v. Seaboldt, 735 F.3d 1311, 1331–33 (11th Cir. 2013).	No tests performed. This case is notable because the Eleventh Circuit referred to MRI and CAT scans as “objective diagnostic tests.”	Claimed trial counsel failed to adequately investigate alleged PTSD and frontal lobe damage.	Unsuccessful. There were no “red flags” at the time of trial that would have led reasonable counsel to believe petitioner suffered from a mental disorder. Though she had three experts testify at her PCR hearing, they failed to substantiate their findings by using “objective diagnostic tests, such as MRI or CAT scan[s].”
Head v. Carr, 544 S.E.2d 409, 422–23 (Ga. 2001).	MRI	MRI showing organic brain damage was used as mitigating evidence at penalty phase. However, no cause for the brain damage was presented. Claimed IAC because trial counsel failed to obtain defendant’s birth records that supported a finding of brain damage, which would have triggered the defense expert to order neuropsychiatric testing.	Unsuccessful. “It is simply not reasonable to put the onus on trial counsel to know what additional information would have triggered [the defense expert] to order neuropsychiatric testing; a reasonable lawyer is not expected to have a background in psychiatry or neurology.”
Hernandez v. Martel, 824 F. Supp. 2d 1025, 1068–70 (C.D. Cal. 2011).	EEG	Defense expert performed an EEG while defendant was under the influence of alcohol; results were normal. Defendant claimed IAC during guilt and penalty phases because the alcohol had not taken effect when the test was performed and counsel did not request an EEG while defendant was under the influence of drugs.	Unsuccessful. Petitioner could not show that EEG was performed improperly, nor did counsel have any indication that the test was improper.

Hernandez-Alberto v. State, 889 So. 2d 721, 730–31 (Fla. 2004) (per curiam).	Requested PET	PET scan would have been used to provide evidence of the presence or absence of brain injury possibly caused by an auto accident a few years prior to the murders and/or other unknown incidents in defendant's history.	Successful. Court agreed and set aside funds for the scan. Defendant then refused to allow PET scan to be performed on him.
Hernandez v. State, 180 So. 3d 978, 1006–10 (Fla. 2015) (per curiam).	qEEG	Claimed IAC because trial counsel failed to get qEEG admitted at penalty stage and failed to further investigate brain damage with additional testing.	Unsuccessful. Court held that qEEG was not admissible under <i>Frye</i> at time of trial because “the relevant scientific community was neurologists whose job it is to diagnose brain damage, and because all the testifying experts agreed that qEEG was not generally accepted by that scientific community as a method of diagnosing brain damage, the court was correct in finding [defendant's] trial counsel was not deficient in failing to obtain qEEG testing on [defendant] as a way of demonstrating brain damage in 2007.” Moreover, counsel's failure to conduct further testing to support a mental defect argument was not deficient.
Hodges v. State, 55 So. 3d 515, 525–26, 533–37 (Fla. 2010) (per curiam).	MRI, CAT	MRI and CAT were administered during penalty phase to assist in determining whether defendant was mentally disabled.	Unsuccessful. Scans were normal; though several neuropsychiatrists diagnosed defendant with a mental disability, death penalty was affirmed.
Holiday v. Stephens, No. H-11-1696, 2013 WL 3480384, at *37–38 (S.D. Tex. July 10, 2013).	EEG	Claimed IAC because defense counsel did not adequately evaluate defendant's organic brain damage.	Unsuccessful. Counsel conducted EEG, and no apparent brain damage was observed. Counsel had no duty to undertake further brain scanning based on possibility that something significant would be observed.

Holland v. State, 705 So. 2d 307, 333–35 (Miss. 1997),  <i>post-conviction relief denied</i> , 878 So. 2d 1, 10 (Miss. 2004) (en banc).	EEG performed, requested CAT & MRI	Claimed trial court erred in denying request for additional testing when results of EEG were normal. A defense expert testified to the EEG defendant had received and submitted an affidavit alleging need for further neurological testing.	Unsuccessful. Defendant's requests for CAT scan and MRI were properly denied. Defendant failed to establish the need for such tests.
Hooks v. Thomas, No. 2:10cv268-WKW, 2011 WL 4542901, at *1–5 (M.D. Ala. July 1, 2011),  <i>report and recommendation adopted</i> , No. 2:10-CV-268-WKW, 2011 WL 4542675, at *1 (M.D. Ala. Sept. 30, 2011).	Requested fMRI, PET	Death row inmate requested fMRI and PET scans to prove that he suffered from frontal lobe dysfunction and therefore could not be executed. No funds were requested, only leave to conduct scans. Claimed testing was necessary to avoid Eighth Amendment violation, and testing was not available at the time of original trial.	Unsuccessful. Though the science linking frontal lobe dysfunction to decreased judgment and impulse control was available at the time of trial, PET scans were available and the petitioner did not pursue testing at that time. Additionally, the U.S. Supreme Court had not ruled on the constitutionality of executing someone with frontal lobe dysfunction.
Hoskins v. State, 702 So. 2d 202, 209, 210 (Fla. 1997) (per curiam), <i>sentence vacated</i> , 735 So. 2d 1281, 1281 (Fla. 1999) (per curiam).	Requested PET	Claimed trial court erred in denying request for a PET scan. The funds for the test were available, and the court-appointed expert testified that the PET scan was necessary to render a more definitive opinion regarding defendant's neurological status.	Successful. Trial court abused its discretion in denying request for the PET scan and compounded the error by claiming defendant's mental condition was not at issue. The court could not say whether this error had an effect on the outcome of the proceeding because the testing was not performed. The case was remanded so PET scan could be conducted. The court ruled that after the PET scan, the trial judge should hold an evidentiary hearing to determine whether the PET scan showed an abnormality and, if so, whether the expert would change his trial testimony as a result. If the

			expert would change his testimony solely because of the PET scan results, a new penalty phase would be required. The scan was conducted, there was an abnormality, and the expert's testimony did change as a result. Defendant received a new penalty phase and was again sentenced to death by a jury with a vote of 11-1. Sentence was affirmed by the Florida Supreme Court.
Jackson v. Workman, No. 08-CV-204-JHP-FHM, 2013 WL 4521143, at *13–18 (N.D. Okla. Aug. 26, 2013).	MRI, SPECT, EEG	Claimed IAC for trial counsel's failure to cross-examine an expert witness thoroughly who claimed brain scans showed no signs of organic brain damage and for failure to question thoroughly his own expert witness.	Unsuccessful. The State and defense presented two experts with divergent opinions regarding defendant's brain scans. Both experts were allowed to give testimony, and both were sufficiently challenged during cross-examination.
Jennings v. Stephens, 537 F. App'x 326, 331–33 (5th Cir. 2013) (per curiam), <i>rev'd</i> , 135 S. Ct. 793 (2015)..	QEEG, SPECT	Claimed IAC for trial counsel's failure to find and examine a previous psychological report that indicated petitioner may suffer from a mental disability. SPECT and QEEG testing at the time of habeas hearing indicated petitioner had organic brain damage consistent with learning disability and post-concussive syndrome.	Unsuccessful. The State had evidence refuting petitioner's claim of mental disability that would mitigate the psychological report and brain scan evidence. Therefore, petitioner was not prejudiced at the time of trial.
Johnston v. State, 63 So. 3d 730, 742–43 (Fla. 2011) (per curiam). <i>See generally</i> Johnston v. State, 841 So. 2d 349, 354 (Fla. 2002) (per curiam).	MRI, EEG, PET	Claimed IAC for failing to introduce PET scan results at penalty phase (MRI & EEG showed no abnormalities). PET scan used to provide evidence of "substantial" (according to defense expert) frontal lobe impairment, which correlated with defendant's poor judgment,	Unsuccessful. Brain scan data and testimony accepted as a mitigating factor, but death sentence upheld.

		impulsivity, and difficulty in resisting urges.	
Jones v. Ryan, 583 F.3d 626, 637–40 (9th Cir. 2009), <i>vacated</i> , 563 U.S. 932 (2011) (mem.).	None requested or performed	Claimed IAC for failing to secure partisan psychiatric expert and failing to order neurological and neuropsychological testing as mitigating evidence.	Successful. Counsel did not follow case law and ABA guidelines in seeking mental health experts and instead relied on a neutral court-appointed expert to testify about defendant's mental health.
Keck v. State, No. 61675, 2015 WL 1880587, at *2, *5 (Nev. Apr. 21, 2015).	Brain scan (unspecified)	Defendant introduced unspecified brain scan evidence in the sentencing phase of his trial that "suggested that he may have suffered head trauma at some point in his life, which could have led to 'odd, peculiar behavior' and 'catastrophic failure in [his] impulse control and [his] judgment.'"	Successful. The court held that jury's weighing of aggravating and mitigating evidence, including evidence of possible mental defects, was not unreasonable.
Keough v. State, No. W2008-01916-CCA-R3-PD, 2010 WL 2612937, at *11, *22–24 (Tenn. Crim. App. June 30, 2010), <i>vacated</i> , 356 S.W.3d 366 (Tenn. 2011).	PET, CAT	Appeal of post-conviction court's decision not to grant relief. Claimed IAC for failure to investigate and present evidence relating to petitioner's alcoholism. Brain scans conducted during post-conviction hearing showed evidence of brain damage resulting from severe alcoholism that impaired petitioner's impulse control.	Unsuccessful. At the time of trial, defense counsel had no evidence of cognitive impairment and therefore no duty to investigate further. Additionally, even if counsel had presented evidence relating to petitioner's alcoholism, it likely would not have changed the verdict because the jury knew that defendant was drunk at the time of the crime.
Knight v. State, 76 So. 3d 879, 884 (Fla. 2011) (per curiam).	MRI, PET	Mildly abnormal PET scan evidence used during penalty phase. One expert testified that PET scan showed defendant had asymmetrical brain activity that may have been indicative of a seizure disorder. Another expert testified that the brain abnormality was minimal. MRI was normal.	Unsuccessful. Defendant sentenced to death.



Leavitt v. Arave, 646 F.3d 605, 607, 609–15 (9th Cir. 2011).	EEG, CAT, MRI	Petitioner was initially sentenced to death. Trial counsel presented mitigating mental health evidence (personality disorder and slight aberration on CT scan) and requested an MRI, which was denied. Death sentence was overturned at the Idaho Supreme Court, and at the second sentencing hearing, new counsel did not renew request for MRI and chose not to present mitigating mental health evidence. Petitioner was again sentenced to death and claimed IAC.	Unsuccessful. The Ninth Circuit granted leave for an MRI, which showed white lesions on petitioner's brain. However, there was no way to know if the lesions would have been apparent at the time of the second sentencing hearing. Moreover, it is unclear what, if any, effect the lesions had on petitioner's mental state and behavior. Because petitioner's initial counsel presented a failed mental health defense, it was reasonable for counsel to forego pursuing an MRI and switch mitigation tactics.
Lee v. Ryan, No. CV-04-39-PHX-MHM, 2010 WL 3923091, at *36–48 (D. Ariz. Sept. 30, 2010).	EEG, MRI	Claimed IAC for failure fully to investigate potential mitigating evidence and for not obtaining a meaningful psychiatric evaluation from a defense expert as opposed to the court-appointed psychiatrist. Also claimed counsel did not give psychiatrist complete records of petitioner's life history.	Unsuccessful. Brain scans conducted at PCR hearing showed no abnormalities. Counsel thoroughly investigated petitioner's background, and even if counsel had given court appointed psychiatrist complete records, his diagnosis would not have changed.
Lockett v. Anderson, 230 F.3d 695, 710–17 (5th Cir. 2000).	No tests performed	Claimed IAC for failure to investigate brain damage during penalty phase. The only psychiatrist consulted was hired by defendant's mother, who recommended a CT scan, EEG, and neuropsychological studies.	Successful. There was enough evidence to suggest defendant was suffering from some form of mental illness, which counsel failed to investigate for no strategic reason. Death sentence reversed, and case remanded for new sentencing hearing.
Lorthe v. Comm'r of Corr., 931 A.2d 348, 376–77 (Conn. Ct. App. 2007).	No tests performed	Claimed IAC for failure to perform EEG and MRI to prove brain damage and intermittent explosive disorder.	Unsuccessful. Counsel consulted with a psychiatrist during trial who believed testing would be unlikely to show brain damage or abnormalities. It was reasonable for counsel to rely

			on his expert's opinion that there was a low likelihood testing would reveal abnormalities. Petitioner did little more than speculate on the effect potential results would have on the outcome of his case.
Lynch v. Hudson, No. 2:07-cv-948, 2009 WL 3497486, at *2-3 (S.D. Ohio Oct. 29, 2009).	No tests performed	Habeas corpus petition from death row inmate seeking funds for neuropsychological testing to determine if abnormalities existed that could have caused petitioner's pedophilic behavior. Claimed IAC for failure to pursue testing at trial.	Successful. Psychological testing done during trial showed petitioner's intellectual functioning was below average, and further testing was reasonably necessary to examine the extent of his deficiencies and determine whether he could have formed the requisite intent for the crime for which he was convicted.
Lynch v. State, 2 So. 3d 47, 55, 71-77 (Fla. 2009) (per curiam).	PET	Claimed IAC for failure to cross-examine effectively the State's mental health expert and for providing overall incompetent mental health assistance because of a failure to conduct appropriate tests for organic brain damage and mental illness.	Unsuccessful. Counsel was deficient for failing to address and utilize evidence related to defendant's frontal lobe and right-hemispheric cognitive impairment, but defendant was not prejudiced by this deficiency.
Maldonado v. Warden, Chesire, No. CV990429143S, 2002 WL 230753, at *1-2 (Conn. Super. Ct. Jan. 22, 2002).	No tests performed	Petitioned for funds to seek SPECT test and claimed IAC for counsel's failure to obtain testing that could have been used to establish an extreme emotional disturbance defense during trial.	Unsuccessful. Petitioner lacked a sufficient basis for requesting testing, and any tests results (i.e. a brain tumor) could not be used to establish his mental state when the crime occurred nearly 10 years ago.
Mangum v. State, 765 So. 2d 192, 193-95 (Fla. Dist. Ct. App. 2000).	No tests performed	Appeal after the trial court denied defense counsel's motion for funds to conduct PET scan.	Unsuccessful. Petitioner did not establish a need for testing because testing would only be used to support expert's findings based on psychological testing and would not be used as a new basis for defense.

Medina v. Chappell, 781 F.3d 1076, 1087–88 (9th Cir. 2015), <i>vacated as moot</i> , 782 F.3d 1115 (9th Cir. 2015).	CT, EEG	Claimed IAC because trial counsel refused to provide EEG and CT scan results to defendant’s expert on brain injury.	Unsuccessful. Brain scans showed no abnormality; therefore, defendant was not prejudiced by counsel’s withholding of evidence from mitigation expert.
Middlebrooks v. Bell, 619 F.3d 526, 535–37 (6th Cir. 2010), <i>vacated</i> , 132 S. Ct. 1791 (2012) (mem.).	No tests performed	Claimed IAC for counsel’s failure to obtain PET or MRI scans to test for organic brain damage that could provide mitigating evidence.	Unsuccessful. Though petitioner’s claim was not without merit, he failed to provide evidence to support his position, and the argument was therefore procedurally defaulted.
Miller v. State, 926 So. 2d 1243, 1257–59 (Fla. 2006) (per curiam).	PET	Claimed PET scan data and information revealed from the PET scan was “new information” that made the death penalty inappropriate.	Unsuccessful. PET scan data would merely have been cumulative with other neurological evidence.
Noel v. Norris, 322 F.3d 500, 503–04 (8th Cir. 2003), <i>subsequent § 1983 appeal aff’d</i> , 336 F.3d 648 (8th Cir. 2003) (per curiam).	SPECT	Wanted to use a preliminary SPECT scan, conducted five years after sentencing, that indicated potential abnormalities to justify further SPECT scans to discover the exact nature of his brain abnormalities and offer it as newly discovered mitigating evidence.	Unsuccessful. “Despite our best efforts, we cannot discern how the mere unavailability of a particular medical technology at the time of sentencing could violate [defendant’s] rights under either the Constitution or federal law. . . . [T]here is no constitutional right to resentencing based on newly discovered evidence.”
People v. Crittenden, 885 P.2d 887, 901 (Cal. 1994) (in bank).	EEG, BEAM	Test results used to establish defendant’s brain damage. The EEG demonstrated abnormal electrical activity, indicative of seizure disorders.	Unsuccessful. Expert testimony of brain damage admitted as mitigating evidence. Conviction and death sentence affirmed.
People v. Danks, 82 P.3d 1249, 1261, 1281 (Cal. 2004).	MRI, CAT, BEAM	Claimed brain scan evidence revealed organic brain dysfunction and mild damage. A CAT scan showed a cyst on defendant’s brain. An MRI three years later revealed the same cyst but that it was half the size; BEAM results were	Unsuccessful. Expert testimony of results of brain scan data admitted as mitigating evidence. Conviction and death sentence affirmed.

		not “dramatic” but indicated possible abnormalities in electrical activity in the frontal region and left and right temporal lobes.	
People v. Holt, 937 P.2d 213, 231, 271 (Cal. 1997).	PET, EEG	PET scan and EEG provided evidence of organic brain dysfunction and temporal lobe epilepsy and were introduced as mitigating evidence.	Unsuccessful. Expert testimony of brain scan data admitted as mitigating factor. Conviction and death sentence affirmed.
People v. Kraft, 5 P.3d 68, 98, 130 (Cal. 2000).	PET	Wanted to introduce brain scan evidence revealing abnormalities.	Unsuccessful. Expert testimony of brain scan data admitted as mitigating evidence. Conviction and death sentence affirmed.
People v. Morgan, 719 N.E.2d 681, 707–11 (Ill. 1999).	n/a	Claimed IAC for failure to investigate and present mitigating evidence relating to defendant’s organic brain damage (and abused childhood). Affidavits of doctors who discovered defendant’s organic brain damage were submitted to support IAC claim.	Successful. Counsel’s failure to investigate and present mitigating evidence was deficient and prejudicial.
People v. Parson, 187 P.3d 1, 9, 26, 29 (Cal. 2008).	MRI, PET	Offered expert testimony and PET scan to support conclusion of longstanding brain damage to both of defendant's temporal lobes and probable damage to the frontal lobes.	Unsuccessful. Expert testimony of brain scan evidence admitted as mitigating evidence. Conviction and death sentence affirmed.
People v. Sapp, 73 P.3d 433, 469 (Cal. 2003).	MRI, BEAM	Brain scan data revealed abnormalities. Mental health professionals offered testimony that defendant showed signs of organic brain damage and brain dysfunction.	Unsuccessful. Expert testimony of brain scan evidence admitted as mitigating evidence. Conviction and death sentence upheld.
People v. Urdiales, 871 N.E.2d 669, 684, 716, 724–25 (Ill. 2007).	MRI, SPECT	Brain scan evidence revealed abnormalities, including atrophy. An expert testified that the defendant was	Unsuccessful. Expert testimony admitted in penalty phase to establish statutory mitigating factors of

		insane at the time of the crime, but this defense was not successful; the defendant was convicted. The brain scan evidence was then offered in the penalty phase.	reduced mental capacity or extreme emotional disturbance. Conviction and death sentence upheld.
People v. Yeoman, 72 P.3d 1166, 1184, 1185, 1221 (Cal. 2003).	BEAM (EEG)	Defense's mitigating evidence showed that defendant had suffered serious physical and sexual abuse in childhood that affected his development and behavior and possibly caused brain damage. BEAM test showed dysfunction in defendant's temporal or left parietal lobe, which was consistent with his childhood physical abuse.	Unsuccessful. Expert testimony and results introduced as mitigating evidence. Conviction and death sentence upheld.
Pizzuto v. State, 202 P.3d 642, 652, 655, 656 (Idaho 2008).	MRI, PET, SPECT	Claimed district court erred in dismissing defendant's petition for post-conviction relief without permitting recommended additional testing, which included an EEG, MRI, PET, and SPECT. Defendant claimed he was mentally disabled and wanted the testing to help him establish that. A defense expert stated, "[G]iven that it has been over eight years since his last comprehensive neuropsychological examination, I would strongly recommend that he undergo repeat neuropsychometric studies.... Often, patients that have persistent seizure disorders, for example, will decline over time in their overall mental abilities."	Unsuccessful. District court did not err in dismissing defendant's petition without permitting further testing. The court explained, "[Defendant] did not ask the district court to rule on his motion for the specified additional testing. He asked the district court to refrain from dismissing the petition if the court denied [defendant's] motion for summary judgment and to give [defendant's] counsel additional guidance as to what proof was lacking. . . . The real issue presented by the facts is whether the district court abused its discretion by granting summary judgment to the State ... [but] [defendant] has not argued that the district court abused its discretion in this case."

<p>Roberts v. Norris, 526 F. Supp. 2d 926, 927–28, 929, 932 (E.D. Ark. 2007).</p>	<p>MRI, CAT</p>	<p>Used brain scan evidence to provide objectively verifiable data of brain damage. Defendant’s defense was that he was unable to control himself due to his brain injury and related mental problems.</p> <p>State and defense experts agreed that defendant’s MRI revealed significant portions of his right frontal lobe, right temporal lobe, and left temporal lobe were basically missing. Because of these injuries, a defense expert stated that defendant would “[v]ery easily” misunderstand or misinterpret things and that defendant would “jump to conclusions prematurely, not properly think through a situation.”</p>	<p>Successful. Brain scan evidence admitted. “Impressed” by the fact that defendant suffered a serious brain injury, as evidenced by CAT and MRI scans and MMPI and intelligence testing, the district court granted defendant’s stay and abeyance motion. This allowed the petitioner to present his unexhausted claims that he did not competently waive his right to appeal and to seek state post-conviction relief to the state court in the first instance and then to return to federal court for review of his perfected petition.</p>
<p>Robinson v. State, 761 So. 2d 269, 275–76, 276 n.8 (Fla. 1999) (per curiam).</p>	<p>SPECT requested not conducted</p>	<p>SPECT scan would have been used to locate defendant’s brain damage.</p>	<p>Unsuccessful. Defendant failed to establish need for neurological testing to show he suffered from brain damage.</p> <p>“We offer no opinion as to whether such tests should be conducted. Nor do we wish to be interpreted as foreclosing the use of such tests in other cases. Obviously, every case is different. We merely hold that, in this case, there has been an insufficient showing of need for such tests.”</p>

<p>Rogers v. State, 783 So. 2d 980, 998, 997–1000 (Fla. 2001) (per curiam).</p>	<p>Requested PET scan denied; Requested MRI granted and \$1500 in funds given to defense (MRI revealed no evidence of brain damage).</p>	<p>Requested funding for an additional scan. Defense expert stated, “Upon consideration of my preliminary evaluation of [defendant] it is evident that a PET-Scan of the brain will be necessary to complete this evaluation.” Claimed trial court erred in denying motion requesting a PET scan.</p>	<p>Partially successful. Results of the first scan admitted. Request for additional scan denied. Trial court acted within its discretion in denying defendant's request for PET-Scan to obtain mitigating evidence. Defendant did not demonstrate particularized need or prejudice. Defense experts testified to defendant's brain damage and mental health in the penalty phase, and the trial court found a statutory mitigating circumstance pertaining to defendant's mental condition without the scan.</p>
<p>Samra v. Price, No. 2:07-cv-1962-LSC, 2014 WL 4452676, at *2, *5–6, *21–25, *31 (N.D. Ala. Sept. 5, 2014).</p>	<p>MRI, SPECT</p>	<p>In preparation for trial, a psychiatrist recommended the defendant complete neuropsychological testing, neurological evaluation, and neuroimaging such as MRI or PET.</p> <p>On the first PCR appeal, funding for a SPECT scan was requested and granted.</p>	<p>Unsuccessful. Defense counsel decided not to present this psychiatrist's testimony and imaging evidence at trial because it was harmful to the defense. An MRI was collected but was negative for any lesions or pathology. Defense attorney inquired into receiving a PET scan, but none was performed. The psychiatrist's report stated that he believed the defendant was capable of committing a similar crime again and that the defendant knew what he did was wrong.</p> <p>The defendant filed a PCR petition claim that included an ineffective assistance of trial and appellate counsel (the same attorney served as trial and appellate counsel) claim for</p>

			<p>not investigating and presenting evidence of his purported “brain damage and organic brain dysfunction.” The defendant was granted an evidentiary hearing on this issue.</p> <p>A neuropsychologist testified that the defendant had a brain dysfunction that impaired his verbal information processing and had impaired frontal lobe activity. A radiologist testified the defendant had reduced blood flow to the front and middle parts of his brain.</p> <p>The court declined to find IAC. The attorney investigated, and the results of that investigation were not that compelling. There was no reasonable probability the additional evidence offered during the evidentiary hearing would have resulted in a different verdict.</p>
Sexton v. State, 997 So. 2d 1073, 1075–76, 1082–85 (Fla. 2008) (per curiam).	PET	Claimed IAC in improperly investigating and presenting mental health mitigation. During the penalty phase the defense presented two psychologists to testify about defendant’s brain dysfunction, revealed by a PET scan.	Unsuccessful. This testimony was admitted in the second penalty phase (initial conviction was reversed and remanded for a new trial and new penalty phase), and based upon it, the trial court found one statutory mitigator—that the defendant was under extreme mental or emotional disturbance at the time the murder was committed—and gave this mitigator great weight. Defendant



			failed to establish that trial counsel was ineffective in obtaining and presenting mental health mitigation. However, defendant was sentenced to death and the denial of post-conviction relief affirmed.
Shank <i>ex rel.</i> Scudder v. Mitchell, No. 2:00-CV-17, 2008 WL 4449567, at *14–15, *18, *21, *25 (S.D. Ohio Sept. 30, 2008).	N/A	Claimed IAC and that his serious mental illness prevented him from being executed. Defense expert psychologist testified at the mitigation hearing that petitioner had a severe personality disorder and that he had congenital brain damage, which became “more severe” throughout his life as a result of substance abuse.	Unsuccessful. There was no evidence to support this claim on direct appeal and consequently petitioner’s serious mental illness claim was barred from review in federal habeas.
San Martin v. State, 995 So. 2d 247, 261–62, 265 (Fla. 2008) (per curiam).	EEG	Claimed IAC for presenting inconsistent and contradictory testimony by the expert witnesses relating to defendant’s mental health, brain damage and mitigating factors. As a result, the court did not consider the brain scan/mental health evidence as a mitigating factor.	Unsuccessful. On appeal, the court denied an evidentiary hearing on the matter. Conviction and death sentence upheld.
Sheppard v. Bagley, 604 F. Supp. 2d 1003, 1113 (S.D. Ohio 2009).	No scans performed	Claimed IAC because of failure to raise as error on direct appeal alleged prosecutorial misconduct when the prosecutor attempted to discredit the defense expert by questioning his diagnosis of paranoid schizophrenia based on the absence of an MRI or CAT scan.	Unsuccessful. Defendant was not prejudiced by the State’s observation that no MRI or CAT scan was performed. The defense expert explained that he did not request those scans in the course of his evaluation because those tests were used to detect organic brain damage, which is neither a cause nor a symptom of paranoid schizophrenia.

Smithers v. State, 826 So. 2d 916, 918, 921–22 (Fla. 2002) (per curiam).	PET	Defense expert testified a PET scan of defendant’s brain was abnormal and consistent with brain damage due to head trauma.	Unsuccessful. Defense expert testimony admitted. Trial court found two statutory mitigating factors: extreme emotional disturbance (given moderate weight) and diminished capacity to appreciate criminality of his conduct or conform his conduct to requirements of the law (given moderate weight). Aggravating factors outweighed mitigating factors. Defendant sentenced to death on both counts.
Sorto v. Stephens, No. H-10-CV-613, 2015 WL 5734464, at *31–32, *35–36 (S.D. Tex. Sept. 30, 2015).	Unspecified brain scan	Claimed IAC because trial counsel failed to introduce evidence of PTSD and organic brain damage resulting from violent upbringing and chemical exposure.	Unsuccessful. Defense counsel’s decision to not introduce such mitigation evidence was reasonable given that unspecified “brain scan” showed no evidence of organic brain damage.
State v. Elmore, No. 2005-CA-32, 2005 WL 2981797, at *16–17 (Ohio Ct. App. Nov. 3, 2005).	PET requested not conducted	Claimed IAC because counsel failed to secure funds for and arrange a PET scan of his brain that would show the extent of traumatic brain damage caused by an injury he suffered at the age of sixteen.	Unsuccessful. Appellate court denied petition. Court agreed with the trial court’s finding that defendant’s claim was barred by res judicata.
State v. Mercer, 672 S.E.2d 556, 559, 561–62 (S.C. 2009).	SPECT	“[T]rial court abused its discretion during the penalty phase by (a) precluding [defense expert] from opining that a ‘SPECT Scan’ of [defendant’s] brain revealed an ‘abnormality’; and (b) precluding [defense expert] from offering expert psychiatric opinion testimony.”	Unsuccessful. Court found it was clear error to exclude defense expert’s this testimony, but defendant was not prejudiced by the error. Another defense expert previously testified that the SPECT Scan revealed an abnormality. The court found the error harmless.

State v. Reid, 213 S.W.3d 792, 804, 808, 820 (Tenn. 2006).	MRI, PET	Defense experts testified to defendant's brain damage. Expert associated damage to defendant's left temporal lobe with psychotic disorders that produce delusional states but noted that the brain injury would not have prevented defendant from planning and executing the robbery and murders.	Unsuccessful. Expert testimony admitted. Death sentence upheld. The mitigating evidence was "compelling," but aggravating circumstances were "overwhelming."
State v. Scudder, 643 N.E.2d 524, 534 (Ohio 1994).	MRI requested but not conducted	Requested an MRI to provide evidence of organic brain damage.	Partially successful. Expert testimony of appellant's history and background were admitted and given some weight in mitigation.
Welch v. State, 992 So. 2d 206, 210 & n.1 (Fla. 2008) (per curiam).	PET	Defense presented testimony of two mental mitigation experts during the penalty phase. Expert testimony included the abnormal PET scan results.	Unsuccessful. Expert testimony admitted. The abnormal brain scan was found to be a nonstatutory mitigator and therefore given little weight.
Williams v. Allen, 542 F.3d 1326, 1337–45 (11th Cir. 2008).		Claimed IAC for investigation of mitigating evidence in defendant's background fell short of prevailing professional norms and that this prejudiced defendant at sentencing.	Successful. Federal habeas relief granted as to defendant's sentence. Reversed district court's denial of relief on IAC claim. The court stated that surely the evidence that trial counsel failed to uncover "would have been relevant to an assessment of [defendant's] culpability, particularly in light of his age and lack of prior criminal history."
Woodall v. Commonwealth, 63 S.W. 3d 104, 126 (Ky. 2002).	PET scan requested not conducted	Defendant alleged he suffered from various brain disorders. He claimed the trial court erred in denying his request for a continuance and his request for funding for a PET scan.	Unsuccessful. The trial court did not error in denying the continuance or request for funding for a PET scan and other psychological testing. The Kentucky Correctional Psychiatric

			Center (KCPC) report specifically eliminated the possibility of organic brain damage. A psychologist testified at defendant's penalty hearing, and his report was introduced as mitigating evidence.
People v. Calabrese, 924 N.E.2d 6, 22–23, 29 (Ill. App. Ct. 2010).	MRI, EEG	Defendant tried to use scan evidence to argue trial court erred in not mitigating murder sentence. Expert analysts testified to “decreased ability to tolerate frustration and manage conflict,” among other deficits.	Unsuccessful. Court said no statutory mitigating factors were present, and mental health issues did not necessitate a minimum sentence, so the trial court did not abuse its discretion.
People v. Chavez, 73 Cal. Rptr. 3d 189, 194–96 (Ct. App. 2008) (Parts 2–3 of Discussion unpublished).	PET	Defendant's PET scan showed left lateral frontal abnormalities in the brain, which was used as part of insanity defense. At trial, defendant was found insane for several counts but sane for three others, which he contended was error.	Unsuccessful. Another expert testified the defendant was sane at the time of the crimes in question. The appellate court ruled it was within the jury's reasonable discretion to weigh the experts' testimony as it did.
People v. Combs, 101 P.3d 1007, 1016–17, 1027–28 (Cal. 2004).	EEG, MRI	Used EEG and MRI evidence to show abnormalities and lesions on brain as a result of brain damage that occurred early in life.	Unsuccessful. The defendant's expert who presented the scans conceded that defendant was not mentally disabled and knew right from wrong. The jury was free to reject the expert testimony that defendant was mentally ill.
People v. Kelly, 800 P.2d 516, 523, 542 (Cal. 1990) (in bank).	CAT, EEG	Defendant had scans performed to test brain functioning. The EEG was normal. The CAT scan showed organic brain damage, but expert said the effects of the damage on behavior could not be determined from the scan.	Unsuccessful. The jury was able to consider the evidence, and there was no prejudicial error in the lower court.
People v. Lyles, 478 N.E.2d 291, 300–02, 308 (Ill. 1985), <i>abrogated on other grounds</i>	EEG, CAT	Argued extreme mental or emotional disturbance while committing the crimes. Psychiatric consultant ordered	Successful. Sentence vacated despite normal brain scans. Court said prosecution did not offer evidence to

<i>by Batson v. Kentucky</i> , 476 U.S. 79 (1986).		EEG and CAT scans, which showed no abnormality but did not change conclusion about whether brain damage was present.	contradict expert's assertion that normal EEG and CAT scans do not preclude brain damage.
<i>People v. Martinez</i> , 224 P.3d 877, 896, 898, 915 (Cal. 2010).	PET	PET results showed neurological damage consistent with inhaling solvents according to the defendant's expert. The prosecution's expert disagreed with the findings. Defendant alleged prosecutorial misconduct in presenting the evidence.	Unsuccessful. The court said the prosecution was not trying to be misleading but only trying to avoid confusion on complex topics.
<i>People v. Nelson</i> , 922 N.E.2d 1056, 1071, 1074, 1091 (Ill. 2009).	CAT	Defendant offered mitigating evidence that he sustained brain damage, which was a significant factor in his lack of control. CT scan showed brain lesion consistent with this.	Unresolved. The court remanded the case on another issue before reaching the issue of mitigating evidence.
<i>People v. Page</i> , 620 N.E.2d 339, 348–50 (Ill. 1993).	N/A	Defendant alleged he was deprived of a fair sentencing hearing after prosecution argued that the lack of brain scans indicated defendant had no organic brain damage.	Unsuccessful. The court stated the prosecution's comments were not prejudicial error because the jury was instructed not to take the comments as evidence.
<i>People v. Reyes</i> , 536 N.E.2d 990, 993, 998 (Ill. App. Ct. 1989).	EEG	Defendant raised defense of insanity. Psychiatrist testified that there were no abnormalities in brain scans, but defendant suffered from anti-social personality disorder and substance abuse. Defendant appealed to reduce his sentence.	Unsuccessful. The appellate court said the trial judge already declined to impose the death penalty due to the defendant's diminished mental capacity and was within his discretion in imposing the sentence.
<i>People v. West</i> , 719 N.E.2d 664, 669, 681 (Ill. 1999).	PET	Claimed IAC because counsel failed to investigate and present evidence on organic brain syndrome for sentencing hearing. Requested funds for PET scan to substantiate his IAC claim.	Unresolved. The court remanded the case on another issue before reaching the IAC claim.

People v. Hung Thanh Mai, 305 P.3d 1175, 1200–01 (Cal. 2013).	MRI, CAT (not performed)	Claimed IAC because counsel failed to pursue brain scan testing after defense’s psychologist recommended MRI or CAT scans.	Unsuccessful. The record indicated that the tests were never performed because the defendant became uncooperative while in confinement and not because counsel failed to pursue the matter.
People v. Rogers, 304 P.3d 124, 141, 160–61 (Cal. 2013).	CAT, PET	Defense’s experts reviewed CAT and PET scans taken after an earlier incident in which defendant was struck with a pool cue. Experts concluded that damage had been done to the brain that would have made it difficult to control behavior. Argued that death penalty statute dealing with mitigating evidence was unconstitutional.	Unsuccessful. Court said that each of the defendant’s constitutionality claims had been repeatedly rejected by the court, and defendant offered no sound reasons to reconsider.
Philmore v. McNeil, 575 F.3d 1251, 1261–65 (11th Cir. 2009) (per curiam).	Unspecified brain scan	Brain scan at evidentiary hearing showed abnormality that caused impulsivity. Claimed IAC because counsel did not call the expert for the penalty phase. Also argued the court erred by ignoring another expert’s testimony showing the statutory mitigator of extreme mental or emotional disturbance.	Unsuccessful. Counsel had reasons for not calling the expert, whose testimony would have been inconsistent with other experts who presented other mitigating evidence. Defendant was barred from arguing the trial court ignored the mitigator because defendant failed to raise the argument on direct appeal.
Pittman v. State, 90 So. 3d 794, 816 (Fla. 2011) (per curiam).	PET	New testimony about brain damage given at post-conviction hearing. Defendant argued PET scan testimony required a new penalty phase proceeding.	Unsuccessful. PET scan was taken 12 years after the crime and was not the type of evidence that would probably produce a different result on remand.
Priest v. Smith, No. CV01-0173-C-MHW, 2009 WL 3109805, at *4–9 (D. Idaho Sept. 23, 2009).	EEG, CAT	Claimed his mental health condition should be a basis for tolling the statute of limitations for filing a habeas corpus action.	Unsuccessful. Defendant had filed other things in the past; the brain disorder did not play a role in the untimeliness of his petition.

		Also claimed that later-discovered CAT scan showed mental illness sufficient to change the outcome of the trial at guilt phase.	Unsuccessful. Defendant did not prove the newly discovered evidence would have made any of the jurors change their minds.
Robards v. State, 112 So. 3d 1256, 1264, 1272–73 (Fla. 2013) (per curiam).	PET	Presented PET evidence of brain damage at hearing to support existence of statutory mental mitigating circumstances. Found traumatic brain injury and toxic brain exposure.	Unsuccessful. The trial court considered the evidence as a mitigator, but the state supreme court affirmed the proportionality of the death sentence, citing other cases that also found mitigators but upheld the death penalty.
Robinson v. State, No. W2011-00967-CCA-R3-PD, 2013 WL 1149761, at *18, *84–85 (Tenn. Crim. App. Mar. 20, 2013).	CAT	Claimed IAC because counsel did not retain a neuropsychologist and have neuro testing done. Previous CT test after injury was unremarkable.	Unsuccessful. The original psychologist who performed the tests did not recommend further testing. Defendant failed to show particularized need for new tests, so counsel would not have been able to retain neuropsychologist anyway.
Rodgers v. State, 113 So. 3d 761, 767–71 (Fla. 2013) (per curiam).	PET, CAT	Claimed IAC at penalty phase for counsel relying on two mental health experts in deciding not to pursue neuro testing for organic brain damage. Did not order more scans because there was no indication of brain damage.	Unsuccessful. The court said that trial counsel's investigation into defendant's mental health was reasonable, and even if not reasonable, defendant did not establish prejudice.
Rogers v. Sec'y, Dep't of Corr., No. 8:07-CV-1365-T-30TGW, 2010 WL 668261, at *13–17 (M.D. Fla. Feb. 19, 2010).	MRI, PET requested but not performed	Claimed the trial court erred by denying defense counsel's motions to have PET scans performed before trial for mitigation purposes. MRI scan was granted but was normal. Argued that normal MRI was more of a reason to grant funds for PET because jury could be misled by normal MRI.	Unsuccessful. Defendant had other mental health evaluations done by experts, and defense counsel was able to provide substantial evidence of defendant's mental health by other means.

Sanborn v. Parker, No. 99-678-C, 2011 WL 6152849, at *1 (W.D. Ky. Dec. 12, 2011).	Unspecified brain scan	Defendant sought funds to conduct neuro evaluation and brain scan in support of his petition for clemency.	Successful. Court said the funds were reasonably necessary for defendant's representation, even though defendant was declared competent to stand trial.
Scott v. Ryan, No. CV-97-1554-PHX-PGR, 2011 WL 240746, at *11, *14, *23, *29 (D. Ariz. Jan. 24, 2011).	CT, EEG	Claimed IAC for not investigating and presenting mitigating evidence of traumatic brain injury during sentencing phase. Later CT scan found the presence of atrophy, but earlier scans were normal.	Unsuccessful. Counsel was not ineffective because he wanted to focus on what he believed was the strongest argument, and information about defendant's head injuries was already part of the record. Counsel's investigation was probably less than complete but reasonable because of his strategic choices.
Sells v. Stephens, 536 F. App'x 483, 487–88, 490–95 (5th Cir. 2013).	PET	Claimed IAC for not pursuing mitigating evidence and not calling enough witnesses at penalty phase. PET scan revealed no potentially mitigating signs of brain damage.	Unsuccessful. Defendant was procedurally barred from raising IAC claim, and habeas counsel's failure to investigate trial counsel's failure to develop and present mitigating evidence did not give good cause for procedural default.
Shellito v. State, 121 So. 3d 445, 453–59 (Fla. 2013) (per curiam).	PET	Claimed IAC at penalty phase, arguing defense counsel failed to pursue mental health issues after reports showed possibility of mental health issues. Post-conviction counsel had defendant undergo PET, which showed organic brain damage.	Successful. The newly presented evidence, including evidence about defendant's upbringing, showed a different picture than the one presented at trial. Death sentence vacated and remanded for new penalty phase.
Simmons v. State, 105 So. 3d 475, 503–04, 510 (Fla. 2012) (per curiam).	PET	Claimed IAC at penalty phase, saying counsel did not pursue mental health issues. Later PET showed neuro impairment as a result of defendant suffocating as an infant, but counsel did not investigate this issue prior to trial.	Successful. Significant evidence was presented showing brain damage issues, and counsel was ineffective for failing to investigate these possible mitigators. Death sentence vacated and remanded for new penalty phase.



Sireci v. Sec'y, Fla. Dep't of Corr., No. 6:02-cv-1160-Orl-35KRS, 2009 WL 651140, at *12–14 (M.D. Fla. Mar. 12, 2009).	CAT, MRI	In habeas court, claimed the trial court erred by refusing to find statutory mitigators related to mental health. State expert testified that CAT and MRI showed only mild brain injury.	Unsuccessful. The trial court was within its discretion not to accept the statutory mitigators. Defendant failed to show by clear and convincing evidence that trial court's decision was incorrect.
Smith v. Anderson, 402 F.3d 718, 725–27 (6th Cir. 2005).	CAT, MRI	Claimed IAC for failing to pursue mitigating evidence of mental health issues. CAT and MRI scans taken over 17 years after the crime showed possible evidence of brain damage.	Unsuccessful. The evidence was not the type that would produce a different result because the lesions detected were not the kind that would affect behavior.
State v. Allen, 653 N.E.2d 675, 689–90 (Ohio 1995).	None performed	Claimed the trial court erred by refusing to appoint a neurologist to investigate possible organic brain damage mitigator. Psychologist said a neurologist could determine by CAT or MRI the absence or presence of organic brain impairment.	Unsuccessful. Trial court did not abuse its discretion in denying the motion. Motion was filed after deadline, and defendant failed to show reasonableness of the request. One of the relevant reports indicated little likelihood of brain damage.
State v. Anderson, 996 So. 2d 973, 989–91 (La. 2008).	CAT	Defendant presented evidence of mental disability at trial, and State rebutted with expert testimony that previous head injury did not result in any mental capacity dysfunction and that CAT scan showed brain injuries not related to impulse control or executive functioning.	Unsuccessful. Defendant's mental disability argument was without merit. Defendant did not carry burden of proof to establish mental disability and exemption from death penalty.
State v. Carr, 331 P.3d 544, 728–29, 739 (Kan. 2014) (per curiam), <i>rev'd</i> , 136 S. Ct. 633 (2016).	PET	Defendant challenged trial court's denial for a continuance for his expert to be present during State expert's testimony and take the stand for surrebuttal.	Successful. Defense expert testified to PET data, the presentation of the data, and his interpretation of the data. State's expert criticized the presentation and interpretation of the PET data. The state supreme court found the defense expert should have been permitted to retake the stand to defend his methods against

			<p>suggestions by the State and its experts that he had deliberately misled the jury. The court declined to discuss harmlessness because the case was remanded for other reasons.</p> <p>Because the district judge's failure to sever the penalty phase violated the defendant's Eighth Amendment right to individualized sentencing and that cannot be said to be harmless error, the court vacated the defendant's death sentence for the murder of four of the victims and remanded the case to district court for further proceedings.</p>
Cooper v. Ricci, No. 10-2901 (AET), 2013 WL 1385637, at *15, *17–18 (D.N.J., Apr. 3, 2013).	SPECT, MRI	Claimed IAC for pursuing an “uninformed mitigation strategy” that prevented defense from introducing evidence of mental disease and defect. Initial evaluations showed possible fetal alcohol syndrome, and doctors recommended PET, SPECT, MRI and CT, but only SPECT was done, which showed cognitive disorder	Unsuccessful. The court said defendant did not prove there was a reasonable probability the outcome would have been different had the omitted evidence been presented, and judge found there was “no demonstrable physical irregularities in [defendant's] brain.”
State v. Frogge, 607 S.E.2d 627, 631, 637–38 (N.C. 2005).	CAT, MRI	Claimed IAC for not investigating evidence of organic brain damage through neuro testing. MRI showed no anomalies, but expert testified that such a result did not rule out neuro disorder.	Unsuccessful. Overturned the lower court and reinstated death penalty. Counsel investigated defendant's medical history, and experts did not recommend further neurological testing.
State v. Grell, 135 P.3d 696, 699–701, 709 (Ariz. 2006) (en banc).	PET	After U.S. Supreme Court determined mentally disabled defendants could not be executed, the case was remanded to evaluate mental capacity	Unsuccessful. While defendant fell under the definition of mental retardation according to the DSM-IV, that definition is not the same as the

		of defendant. Trial court found no mental disability, and defendant appealed. The only expert qualified to read the PET scan was State's expert, who concluded there was no brain damage.	statutory definition. The evidence supported the trial court's finding that defendant was not mentally disabled.
State v. Henretta, 325 S.W.3d 112, 123, 143, 148 (Tenn. 2010).	MRI, CAT, EEG	Defendant appealed his death sentence and argued the aggravating factors did not outweigh the mitigating factors. Forensic psychiatrist concluded that defendant had brain disorders, including intermittent explosive disorder. Part of his testing included MRI, CAT, and EEG.	Unsuccessful. Court stated the evidence established four aggravating circumstances, and these were not outweighed by the mitigating evidence presented by defendant.
State v. Holmes, 5 So. 3d 42, 53, 57, 95–97 (La. 2008).	MRI, PET	Claimed diminished capacity due to fetal alcohol syndrome (FAS) in mitigation and appealed death sentence as excessive punishment. MRI showed some structural abnormalities of the brain consistent with FAS. PET showed structural abnormalities but not the kind consistent with FAS.	Unsuccessful. Court said the aggravating circumstances reasonably outweighed the mitigating circumstances.
		Also claimed in light of new neuroimaging evidence, court should have reevaluated her capacity to stand trial.	Unsuccessful. Court said that even if defendant fit the statutory definition of mental retardation, she may still be found competent to stand trial.
State v. Jerome A., No. 30261-2014, 2015 WL 5236301, at *11–13, *15 (N.Y. Sup. Ct. Sept. 8, 2015), <i>rev'd</i> , 27 N.Y.S.3d 150 (App. Div. 2016).	Brain scans (unspecified)	In support of State's petition for sex offender civil management pursuant to N.Y. Mental Hygiene Law, State's expert relied on published evidence that brain scan evidence distinguished psychopathy from other mental illnesses and that the defendant suffered from psychopathy.	Unsuccessful. The State's petition was denied. The State's expert was not qualified in neuroscience and did not rely on brain scanning of the individual defendant at issue in this case.

State v. Naranjo, 321 P.3d 398, 408–09 (Ariz. 2014).	PET	Claimed trial court erred in precluding expert testimony on neuroimaging because defense counsel failed to give proper notice. Expert gave one-page report that PET scan showed brain injury, and State moved for production of underlying data.	Unsuccessful. Because expert did not provide data, State could not develop any meaningful rebuttal against expert. No abuse of discretion.
State v. Payne, 199 P.3d 123, 153 (Idaho 2008).	None performed	Claimed IAC for several reasons, including counsel not having fMRI or PET scans done to identify abnormalities.	Unsuccessful. Defendant merely took issue with counsel's strategic choices. Evidence suggested counsel made a reasonable investigation on the issues.
State v. Powell, Def. ID # 0909000858, 2011 WL 2041183, at *24 (Del. Super. Ct. May 20, 2011).	CAT, MRI, PET	Appealed murder conviction. Brain scans showed defendant had damaged front temporal lobes and small amygdala, causing defendant to have diminished capacity to evaluate threats.	Unsuccessful. The court recognized the evidence counted as a mitigator, but the weight was not very great because defendant did not murder because of an impulse problem but because he wanted to avoid arrest.
State v. Stuard, 863 P.2d 881, 901–03 (Ariz. 1993) (en banc).	None performed	Appeal of murder conviction and death sentence. Experts testified defendant had organic brain damage and recommended CT or MRI testing, but none was done.	Partially successful. Death sentence reduced to life imprisonment. Evidence showed defendant had organic brain damage and personality disorders. Mental impairment was a substantial mitigator that outweighed the aggravating factors.
State v. Willis, No. W2008-02720-CCA-R3-CD, 2010 WL 3583961, at *2–3, *5–6 (Tenn. Crim. App. Sept. 15, 2010).	X-ray, MRI, CAT	Defendant appealed trial court's refusal to grant judicial diversion. Defendant was injured while in the military, and x-rays, MRIs, CAT scans were performed as part of his treatment. Counsel said defendant had a history of brain injury.	Successful. Remanded for new sentencing hearing. Trial court failed to address all of the factors for judicial diversion, though it did address the circumstances of the offense and defendant's physical and mental health.

Stephenson v. State, No. E2012-01339-CCA-R3PD, 2014 WL 108137, at *6, *24–27 (Tenn. Crim. App. Jan. 13, 2014).	EEG, CAT	Claimed IAC for not presenting evidence of mental conditions in mitigation. Forensic psychiatrist did not diagnose defendant as having personality disorder, and EEG and CAT revealed normal results.	Unsuccessful. Counsel investigated the possibility of a mental defense, decided it could not be substantiated, and instead relied on a different mitigation theory. This was a reasonable strategy.
Stewart v. State, 37 So. 3d 243, 248, 250–55 (Fla. 2010) (per curiam).	PET, CAT, MRI	Claimed IAC for counsel failing to obtain a complete neuropsych exam and a PET scan. Also argued the physicians who evaluated him in preparation for resentencing failed to provide competent mental health services. PET, CAT, and MRI showed enlarged left lateral ventricle, and PET showed left-hemisphere damage.	Unsuccessful. Defense counsel consulted with numerous mental health experts and was not deficient for relying on experts. There was also no prejudice because it was unlikely the evidence would have caused the sentencing court to put more weight on that mitigating factor.
Taylor v. Sec’y, Dep’t of Corr., No. 9:10-cv-382-T-30AEP, 2011 WL 2160341, at *38, *46, *50 (M.D. Fla. June 1, 2011).	PET	Claimed IAC at resentencing for counsel not presenting available mitigating evidence, including neuropsych testing that would have showed brain damage. PET scan showed abnormalities that corroborated brain damage diagnosis, which was refuted by State’s experts.	Unsuccessful. Defense experts’ testimony on brain damage was highly contradicted by State’s experts, so it was unclear whether any statutory mitigators would have been found. Also, the court found five non-statutory mitigators.
Thomas v. Johnson, No. CIV.A.3:00CV051-P, 2001 WL 1335797, at *1, *6–7 (N.D. Tex. Oct. 19, 2001).	EEG, CAT	Petition for habeas corpus, arguing the trial court erred by not giving a <i>Penry</i> instruction for mitigating evidence and focusing on his IQ and not other evidence that showed mental disability. EEG and CT showed no brainwave or structural abnormality.	Unsuccessful. The IQ test scores and absence of brain damage were factually distinct from <i>Penry</i> , so defendant was not entitled to a <i>Penry</i> instruction.
United States v. Witt, 72 M.J. 727, 758, 766 (A.F. Ct. Crim. App. 2013),	CAT	Claimed IAC for not investigating and developing mitigating evidence from motorcycle accident. Mitigation specialist recommended brain imaging, but counsel did not pursue it.	Successful. Counsel was deficient for not pursuing brain scanning. Defense counsel did not have much other mitigating evidence, and evidence of

<p><i>aff'd on reconsideration</i>, 73 M.J. 738, 776 (A.F. Ct. Crim. App. 2014) (en banc).</p>		<p>CT scan after accident was normal, but expert said it was too soon after the accident to be reliable for defense's purposes.</p>	<p>brain injury could have influenced jury's decision.</p> <p>The Government appealed the 2013 ruling. On appeal, the United States Air Force Court of Criminal Appeals reversed as to the defendant's brain injury claim. "[W]e agree that a panel member could find a TBI mitigating on the question of a person's moral culpability if there were evidence the injury influenced that person's behavior. However, the appellant has failed to demonstrate the injuries he sustained in his motorcycle accident had any impact on his behavior the night of the murders, or that the members would have considered an unsupported proposition in that regard to have been sufficiently mitigating to render a more lenient sentence. We therefore conclude that the appellant was not prejudiced by his counsel's failure to introduce evidence of the accident and the appellant's injuries, because under the facts of this case we do not find a reasonable probability of a different outcome."</p>
<p>United States v. Velazquez, No. 10 CR. 1075 VM, 2011 WL 6032388, at *1, *4-5 (S.D.N.Y. Sept. 16, 2011).</p>	<p>MRI</p>	<p>Court postponed sentencing because it felt it was not well enough informed and suspected defendant's crime spree might be due to brain injury.</p>	<p>Successful. Court ordered MRI testing to be done. Noted that it could have gone forward with sentencing, but that could have kept defendant from getting medical care for his condition sooner.</p>

Victorino v. State, 23 So. 3d 87, 94, 106 (Fla. 2009) (per curiam).	PET	Introduced expert testimony of mental disorder for mitigation. Defense expert testified that PET showed abnormality, and State expert testified that PET was normal, and that PET for defendant's purposes was not an established clinical use.	Unsuccessful. Trial court accepted defendant's experts and found nonstatutory mitigation. However, it did not find a nexus between the mental deficit and the crime.
Walls v. McNeil, No. 3:06cv237/MCR, 2009 WL 3187066, at *32 (N.D. Fla. Sept. 30, 2009).	PET, SPECT	Claimed IAC for failing to obtain confirmation of brain damage for mitigation. Filed motion to obtain PET scan to support his claim, which trial court denied.	Unsuccessful. Defendant could not show particularized need for PET or prejudice from denial of the motion. IAC claim failed because experts advised that testing was not necessary, and counsel provided other mitigating evidence.
Weinstein v. Dennison, No. 109871/04, 2005 WL 856006, at *1-2, *8 (N.Y. Sup. Ct. Apr. 13, 2005).	MRI, PET	Inmate sought parole and argued that a cyst, shown by MRI and PET scans, might be responsible for his violent acts. Appealed denial of parole.	Successful. Petition granted and parole board's decision annulled and remanded. Parole board did not properly adhere to the statute. Court noted the inmate's efforts to understand the reasons for his violence, including physical disability.
Whatley v. State, 146 So. 3d 437, 492 (Ala. Crim. App. 2011).	CAT, MRI	On appeal, claimed prosecutor's closing comment that defendant did not have brain damage misstated the evidence. Expert testified CT and MRI were "essentially normal."	Unsuccessful. Counsel's statements were supported by expert testimony.
Wilson v. Humphrey, No. 5:10-CV-489 (MTT), 2013 WL 6795024, at *25, *34, *36-38 (M.D. Ga. Dec. 19, 2013).	None performed	Claimed IAC for not investigating and presenting mitigating evidence. Expert said that because defendant had been in two car wrecks, she would have been interested to see MRI or CAT.	Unsuccessful. Even without brain scans, experts agreed that defendant had ADHD and frontal lobe damage.
Woodall v. Simpson, No. 5:06CV-P216-R, 2009 WL 464939, at *41 (W.D. Ky. Feb. 24, 2009), <i>rev'd</i> , White	None performed	Argued trial judge abused discretion by denying motion for funding to conduct PET.	Unsuccessful. It was a reasonable determination that additional psych testimony was not necessary. Defendant had some testing done, and

v. Woodall, 134 S. Ct. 1697 (2014).			he was not allowed to “expert shop” until he found a favorable diagnosis.
Scott v. Schriro, 567 F.3d 573, 580, 583–85 (9th Cir. 2009) (per curiam).	CAT	Argued IAC for counsel not presenting mitigating circumstances, including brain scan showing atrophy.	Unresolved. Remanded to district court for determination of the IAC claim.
Sells v. Thaler, No. SA-08-CA-465-OG, 2012 WL 2562666, at *75 (W.D. Tex. June 28, 2012).	PET	Claimed IAC for trial counsel not securing funding for experts to investigate mitigating evidence.	Unsuccessful. Trial counsel did everything he or she could reasonably do to get funding for experts.
Sireci v. State, 587 So. 2d 450, 453–54 (Fla. 1991) (per curiam).	CAT, MRI	Appealed death penalty, arguing trial court failed to find statutory mitigators. Expert testified that CAT and MRI showed only mild brain injury.	Unsuccessful. Experts disagreed about the extent of defendant’s brain damage, and judge could properly conclude mitigating circumstances had not been proven.
Smith v. Ryan, No. CV-12-00318-PHX-PGR, 2014 WL 1247828, at *41–46 (D. Ariz. Mar. 24, 2014),  <i>motion to alter or amend judgment denied</i> , No. CV-12-318-PHX-PGR, 2014 WL 2452893 (D. Ariz. June 2, 2014).	PET, MRI (DTI)	Claimed IAC for failing to present mitigating evidence, specifically a PET scan to show defendant’s brain injury. Requested expansion of record and evidentiary hearing to address the claim.	Unsuccessful. Counsel had defendant examined by at least 10 mental health professionals, and brain scan evidence would have been cumulative.  Petitioner faulted counsel for failing to obtain a PET scan of petitioner's brain and MRI/DTI data (type of MRI data). He requested expansion of the record and an evidentiary hearing to address his claim. The court found petitioner was not prejudiced by counsel's failure to secure a PET scan or DTI because the information resulting from those tests duplicated the evidence counsel presented at sentencing.
Smith v. State, 126 So. 3d 1038, 1048–53 (Fla. 2013) (per curiam).	None performed	On appeal, claimed IAC for counsel failing to provide psychiatric records for mitigation. Expert said defendant	Unsuccessful. Defendant could not get relief just because he found an expert after trial that gave more favorable testimony than the expert during trial.



		probably had brain damage that could be identified by PET or MRI.	Expert did not provide actual scans. Circuit court affirmed.
Smith v. State, 170 So. 3d 745, 762–63 (Fla. 2015) (per curiam).	PET, MRI	Appeal of trial court decision that found no mitigation based on alleged brain injury supported by MRI and PET scan evidence.	Unsuccessful. State supreme court upheld trial court’s determination of no mitigating evidence and held that prosecution’s expert witness testimony that PET and MRI scan showed no brain damage was more credible than defendant’s expert testimony that brain scans showed frontal lobe damage.
Smithers v. Sec’y, Dep’t of Corr., No. 8:09-cv-2200-T-17EAJ, 2011 WL 2446576, at *35–38 (M.D. Fla. June 14, 2011).	PET, MRI	Habeas petition challenging conviction and sentences. Claimed IAC at penalty phase for counsel not adequately investigating mental health mitigation. Expert testified that PET scan showed abnormal brain, and State’s expert said PET was insufficient to diagnose.	Unsuccessful. After experts testified about PET and MRI, court found mitigating factors of extreme mental or emotional disturbance and substantially impaired capacity, and gave them moderate weight. Still found aggravating factors to outweigh mitigators.
Trimble v. Bobby, No. 5:10-CV-00149, 2013 WL 1155594, at *3–4, *5–6 (N.D. Ohio 2013), <i>rev’d</i> , 804 F.3d 767 (6th Cir. 2015), <i>petition for cert. docketed</i> , No. 15-8826 (U.S. Apr. 5, 2016).	None performed	Habeas petition, claiming IAC for counsel not requesting and securing a PET scan to support mitigation presentation.	Unsuccessful. Experts did not ask for scans, and only one expert said the scans “could have been helpful in documenting abnormalities.” Inconclusive statement by expert did not meet <i>Strickland</i> requirement that outcome would likely have been different.
Walls v. State, 926 So. 2d 1156, 1170–71 (Fla. 2006) (per curiam).	None performed	Habeas petition, claiming IAC for counsel not having an adequate health evaluation done, including a PET scan.	Unsuccessful. SPECT and PET scans would only have confirmed the experts’ already established opinions, which were already accepted by the trial court.
Rogers v. State, No. SC11-2150, 2012 WL 2890888, at *1 (Fla. July 13, 2012).	PET	On appeal of denial of post-conviction relief, claimed PET scan should have been allowed as evidence.	Unsuccessful. Defendant could not show prejudice because he was able to use other evidence at trial to show his

			brain damage, which the court used to find certain mitigation.
Davidson v. State, 453 S.W.3d 386, 395–96, 406 (Tenn. 2014).	CAT, EEG	Claimed IAC at sentencing for counsel not sharing evidence with neuropsychologist, including CT head scan that showed cerebral atrophy and EEG that was abnormal.	Successful. Court found that counsel was deficient in not showing mental health evidence during sentencing. Remanded for re-sentencing.
Hurst v. State, 147 So. 3d 435, 442–43, 445 (Fla. 2014) (per curiam), <i>rev'd</i> , 136 S. Ct. 616 (2016).	PET	On appeal, claimed trial court should have held a mental retardation hearing before sentencing. PET scan showed brain damage.	Unsuccessful. Defendant was allowed to present all mental retardation evidence at penalty phase.
Faulkner v. State, No. W2012-00612-CCA-R3-PD, 2014 WL 4267460, at *49, *83 (Tenn. Crim. App. Aug. 29, 2014).	MRI	On appeal, claimed he was ineligible for death penalty because of intellectual disability. Expert testified that MRI showed atrophy consistent with fetal alcohol syndrome.	Unsuccessful. None of the experts testified that defendant was intellectually disabled, so the issue was waived on appeal.
Middlebrooks v. Colson, No. 3:03-00814, 2014 WL 3817238, at *7–9 (M.D. Tenn. Aug. 1, 2014), <i>appeal filed</i> , No. 14-6061 (6th Cir. Aug. 27, 2014).	MRI, PET	Claimed IAC for counsel failing to investigate and present evidence of defendant's brain damage. MRI and PET paid for by habeas attorneys showed abnormalities.	Unsuccessful. Defendant's claim was procedurally default because he failed to offer any authority in support of the claim on post-conviction appeal.
Allen v. United States, No. 4:07CV00027 ERW, 2014 WL 2882495, at *62, *73, *160 (E.D. Mo. June 25, 2014).	None performed	Claimed time constriction resulted in unreasonably deficient mitigation investigation. Expert said MRI would not display the type of brain damage defendant potentially possessed.	Unsuccessful. The mitigation specialist effectively developed mitigation themes, even at the expense of his own credibility.
United States v. Witt, 73 M.J. 738, 777–79 (A.F. Ct. Crim. App. 2014) (en banc), <i>aff'g on reconsideration</i> , 72 M.J. 727, 758, 766 (A.F. Ct. Crim. App. 2013).	CAT	Government appealed lower court's decision, arguing there was no IAC for failing to present evidence of motorcycle crash injury.	Decision overturned. No IAC because defendant was not prejudiced. Evidence of brain injury would not have overcome evidence.

Lynch v. Sec’y, Fla. Dep’t of Corr., 776 F.3d 1209, 1221–27 (11th Cir. 2015).	PET	Claimed IAC for counsel not discovering and presenting evidence of brain impairment to avoid death penalty. PET showed abnormality in frontal lobe.	Unsuccessful. The aggravating circumstances outweighed any potential mitigating factors.
State v. Burns, 344 P.3d 303, 313–14 (Ariz. 2015).	fMRI, PET	Claimed the trial court abused discretion by not granting continuance for penalty phase of trial. Argued prejudice because could not produce results of fMRI scan, and neuropsychologist could not analyze PET scan.	Unsuccessful. The PET evidence was not critical to the defendant’s case, and the defendant failed to show how the fMRI results would have helped mitigation.
Miller v. State, 161 So. 3d 354, 370–71, 373–35 (Fla. 2015) (per curiam).	PET, MRI	Claimed IAC for counsel not obtaining a PET scan, which would have showed frontotemporal dementia. MRI was normal, but PET showed abnormal amounts of atrophy.	Unsuccessful. One of the experts testified that defendant did not have dementia, which was supported by the evidence. There was therefore no prejudice.
Nelson v. United States, 97 F. Supp. 3d 1131, 1155–57 (W.D. Mo. 2015), <i>appeal filed</i> , No. 15-3160 (8th Cir. Sept. 28, 2015).	MRI, PET	Claimed IAC for counsel not pursuing a mitigation strategy based on psych testimony. MRI and PET showed frontal system damage in defendant’s brain.	Unsuccessful. Counsel was deficient for not pursuing the mitigation strategy, but defendant was not prejudiced because evidence would not have shifted the scale very much.
Row v. Beauclair, No. 1:98-cv-00240-BLW, 2015 WL 1481416, at *10–12, *14 (D. Idaho Mar. 31, 2015).	CAT, MRI, SPECT	Appealing denial of habeas corpus, claiming IAC for counsel not retaining a neuro-psychiatrist to conduct brain scans for mitigation case. Evidence of brain damage was available to counsel before sentencing. Recent scans also showed brain damage.	Unresolved. More evidence was needed to determine whether defendant’s attorneys were ineffective. Defendant was permitted to move forward to develop evidence.
Hobart v. State, 175 So. 3d 191, 198, 201–02 (Fla. 2015) (per curiam).	MRI, PET	Claimed mitigation based on influence of an extreme mental disturbance. Based on scans, expert diagnosed defendant with substance-induced persisting dementia.	Unsuccessful. There was no testimony about defendant’s mental condition on the day of the murders or how defendant’s mental deficits would have caused the murders.

Chatman v. Walker, 773 S.E.2d 192, 193, 199, 200–01 (Ga. 2015).	MRI	Claimed IAC for counsel not adequately investigating mitigation evidence and inadequately presenting the mitigation case. MRI showed no abnormalities, but defendant suffered from substance abuse.	Successful. Counsel failed to pursue potential avenues for mitigation that were presented by expert. Upheld superior court's decision to vacate death sentence.
United States v. Wingo, 789 F.3d 1226, 1231–32, 1239 (11th Cir. 2015).	MRI, SPECT	Appealed fraud conviction, claiming trial court should have held competency hearing. MRI showed a “stunning” level of atrophy, and SPECT showed large areas of decreased and abnormal activity.	Successful. The evidence gave reasonable cause to believe that defendant was incompetent to proceed. Remanded to district court for competency determination.
Mitchell v. United States, 790 F.3d 881, 884–85 (9th Cir. 2015), <i>petition for cert. docketed</i> , No. 15-8725 (U.S. Mar. 28, 2016).	EEG	Claimed IAC for counsel not investigating possible mitigation on mental health. Experts examined defendant, including scans, and diagnosed him with several disorders and a history of brain injuries.	Unsuccessful. Counsel made a reasonable strategic decision to pursue another mitigation strategy.
Wessinger v. Cain, No. 04-637-JJB, 2015 WL 4527245, at *7–9 (M.D. La. July 27, 2015), <i>appeal filed</i> , No. 15-70027 (5th Cir. Aug. 24, 2015).	Unspecified brain imaging	Claimed IAC for counsel not investigating mitigation evidence to avoid death penalty. Expert during habeas court testified based on brain imaging that defendant had brain impairments.	Successful. Had the mitigation evidence been presented to the jury, it was reasonably likely that one of them would have been swayed to not give the death penalty.
Runnigeagle v. Ryan, No. CV-98-1903-PHX-PGR, 2014 WL 4954412, at *28–29 (D. Ariz. Oct. 2, 2014).	MRI, PET	Scans were recommended by psychologist and psychiatrist to investigate brain damage. It was unclear if scans were ever performed.	Unsuccessful. The court found the “new evidence of Petitioner's mental status [was] tentative and speculative. The failure to present such evidence at sentencing [did] not form the basis for a finding of prejudice.”
People v. Adams, 336 P.3d 1223, 1240–41, 1252 (Cal. 2014).	EEG, PET, MRI, BEAM	EEG was normal. A 1998 PET showed abnormalities but follow-up MRI and PET in 2000 were normal.	Unsuccessful. Three experts testified in the penalty phase for the defense to discuss the imaging results and their opinions. Defendant was convicted

			and sentenced to death. Sentence upheld on appeal.
People v. Boyce, 330 P.3d 812, 852 (Cal. 2014).	EEG	<p>Defendant claimed that the jury instructions did not specifically identify mental or emotional disturbance as a mitigating factor and further that the instruction's reference to "the defendant's character" did not clearly cover the evidence of brain damage and mental illness that he proffered.</p> <p>Defendant also argued his death sentence was disproportionate in light of the mitigating evidence, specifically brain damage, mental illness, and intellectual impairment.</p>	<p>Unsuccessful as to both claims. First, the penalty phase jury instructions did not need to explicitly label factors as mitigating, provided there was no reasonable likelihood jurors would misunderstand the instruction in a way that violated defendant's rights. Defendant's abnormal EEG and history of learning disabilities were consistent with organic brain damage. This evidence was admitted in the penalty phase.</p> <p>In rejecting the second argument, the court explained the jury and trial court considered all of the evidence and determined death was the appropriate punishment. The court declined to create a "new, ill-defined category of murderers who would receive a blanket exemption from capital punishment . . ."</p>
Carter v. State, 175 So. 3d 761, 772–77 (Fla. 2015) (per curiam).	MRI, PET	Claimed IAC for counsel not calling a mental health expert to establish mitigation evidence. Trial counsel called a neurologist who arranged for MRI and PET scans.	Unsuccessful. Trial counsel made a reasonable strategic choice to focus on humanizing the defendant instead of risking bringing up negative aspects.