INTERNET NEWS

BS Nguyễn Văn Công

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Single-Injection Immunotherapy That Halts Alzheimer's

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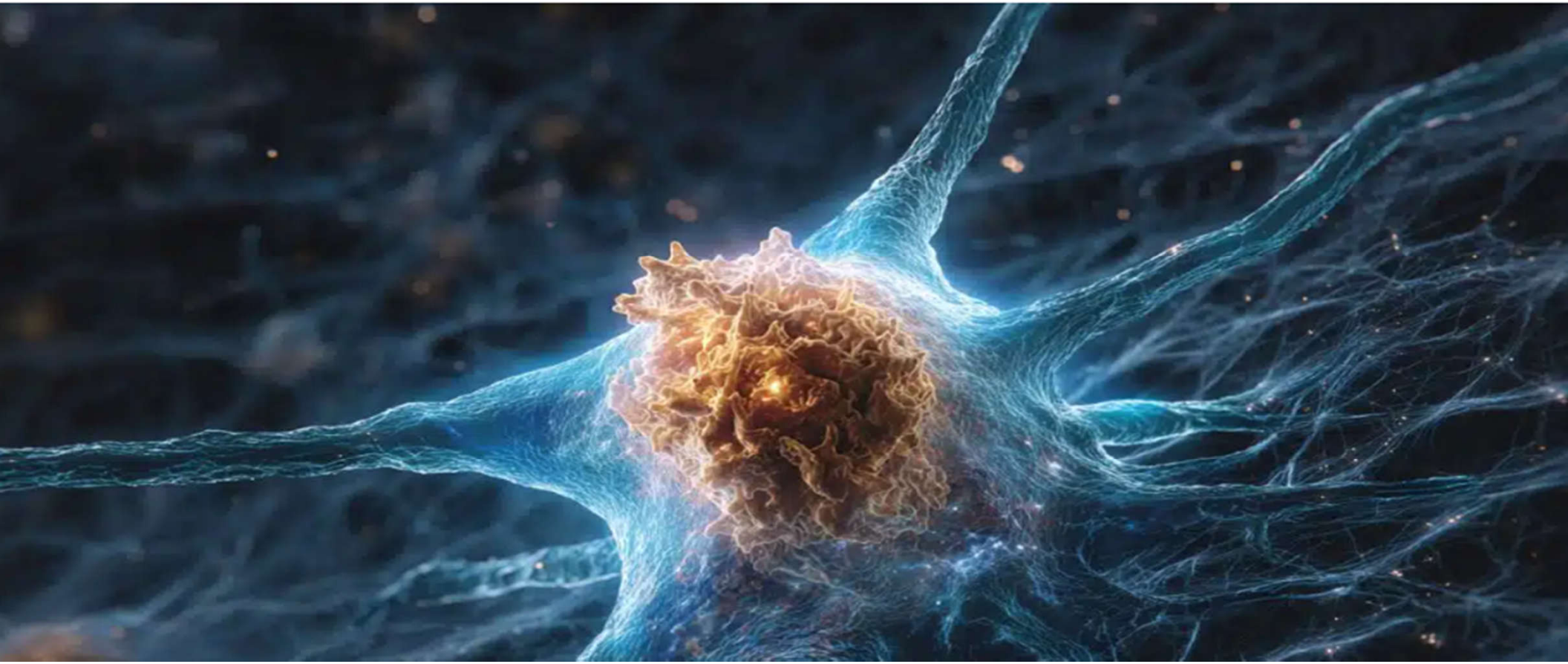
ummary: Current Alzheimer's treatments typically require frequent, high-dose infusions of monoclonal antibodies to slow cognitiv
ecline. But researchers have engineered a potentially game-changing alternative: CAR-astrocytes. Taking inspiration from CAR-T c
herapy used in cancer, scientists used a harmless virus to "reprogram" astrocytes—the most abundant cells in the brain—with a
pecialized "homing device."

hese modified cells, dubbed "super cleaners," are designed to specifically target and engulf amyloid-beta plaques. In a study publish
Science, a single injection of these CAR-astrocytes completely prevented plaque development in young mice and cut existing plaq
vels in half in older mice.

ew generation of Alzheimer's disease drugs — the first proven to change the course of the disease — typically extend endent living for patients by 10 months. Called monoclonal antibodies, they reduce the accumulations of a harmful protein, id, in the brain and require high-dose, once- or twice-monthly infusions of the medication.

to reduce the frequency of treatment and potentially improve the efficacy of an anti-amyloid therapy, researchers at Washingto rsity School of Medicine in St. Louis have engineered a new cellular immunotherapy that requires just a single injection to preve id plaques from developing when given before plaques start to form in mice. Furthermore, a single treatment in mice that had ly developed plaques cut the amount of amyloid plaques in half.



AR-T cell therapies used for cancer treatment, in which T cells of the immune system are genetically modified to attack cancer
his new approach equips cells — in this case, brain cells called astrocytes — with a CAR homing device to grab onto a target fo
ction. These new CAR-astrocyte cells have features that transform them into super cleaners that remove damaging proteins
he brain that play a role in cognitive decline.

tudy marks the first successful attempt at engineering astrocytes to specifically target and remove amyloid beta plaques in th
of mice with Alzheimer's disease," said the study's senior author, Marco Colonna, MD, the Robert Rock Belliveau, MD, Profes
nology at WashU Medicine.

ugh more work needs to be done to optimize the approach and address potential side effects, these results open up an excitin
pportunity to develop CAR-astrocytes into an immunotherapy for neurodegenerative diseases and even brain tumors."

moving brain waste

mer's disease starts with a sticky protein called amyloid beta that builds up into plaques in the brain, setting off a chain of eve
sults in brain atrophy and cognitive decline.

glia, immune cells that reside in the brain, are responsible for removing brain waste but can become dysfunctional when
helmed in the context of neurodegenerative disease.

uce the cleaning burden on microglia, first author Yun Chen, PhD, then a graduate student in the labs of Colonna and David M
man, MD, the Barbara Burton and Reuben M. Morriss III Distinguished Professor of Neurology at WashU Medicine, transform
ytes, the most abundant cell type in the brain, into amyloid-cleaning machines.

stom-designed and delivered a gene to astrocytes that codes for the chimeric antigen receptor (CAR) via a harmless virus inje
ice. The CAR, now present on the surface of astrocytes, enabled the cells to capture and engulf amyloid beta proteins.

eir newly acquired ability, the astrocytes — generally responsible for keeping the brain tidy — concentrated their efforts on onl
g amyloid beta plaques in mice prone to its buildup.

rrying genetic mutations that increase people's risk of developing Alzheimer's disease develop amyloid beta plaques that
e the brain by six months of age. Chen, now a postdoctoral researcher in the Holtzman lab, injected two groups of mice with the
rrying the CAR-expressing gene: young mice before they developed plaques and older mice with brains saturated with plaques
waited three months.

ounger mice aged, the CAR-astrocytes prevented amyloid beta plaque development. At nearly six months of age, when
ed mice normally have brains saturated with harmful plaques, brains of treated mice were plaque-free. Meanwhile, older mice
que-saturated brains at the time of treatment saw a 50% reduction in the amount of amyloid beta plaques compared to mice
g an injection of a virus lacking the CAR gene.

earchers have filed a patent, with help from the Office of Technology Management at WashU, related to the approach used to
r CAR-astrocytes.

tent with the antibody drug treatments, this new CAR-astrocyte immunotherapy is more effective when given in the earlier
f the disease," said Holtzman, who is a co-author on the paper.

ere it differs, and where it could make a difference in clinical care, is in the single injection that successfully reduced the amoun
ful brain proteins in mice."

e studies, the authors aim to continue improving their CAR-astrocyte immunotherapy by fine-tuning its design to better target
proteins, while ensuring no harmful effects on normal brain cell functions.

nally, by adjusting the CAR homing device to recognize specific markers on brain tumors, they could potentially switch
tes' function from cleaning up debris to directly killing tumor cells. Such an approach could offer a promising new way to treat
mors and other central nervous system diseases.

CLINICAL NEWS | CT

DL segmentation of chest muscle volume shows promise for COPD patients

Kate Madden Yee

Mar 5, 2026

ep-learning (DL) algorithm that segments 3D pectoralis muscle volume (PMV) sho
r reproducibility and stronger associations with chronic obstructive pulmonary dise
PD) than an analysis that uses 2D pectoralis muscle area (PMA) data, researchers h
ted.

m led by Miranda Kirby, PhD, of Toronto Metropolitan University in Canada,
ested that automated PMV extraction from routine CT scans could help clinicians
ify COPD patients with comorbid sarcopenia who may benefit from pulmonary
bilitation targeting muscle loss. The group's results were published March 5
diology: Cardiothoracic Imaging.

npared with the established 2D single-section PMA, the 3D PMV offered greater
ducibility and showed stronger associations with clinical outcomes in individuals w
D," the investigators noted.

D is a multisystem disease that affects organ systems in addition to the lungs, and
with the disease experience chronic low-grade inflammation that can lead to musc
hy, or sarcopenia, they explained.

nts with COPD often undergo CT imaging, and identifying those who also have
rbid sarcopenia could help clinicians set rehabilitation plans to target muscle loss,
rding to the authors. They investigated the use of a deep-learning algorithm to asses
ealth of the pectoralis muscle either by volume or by area via a study that included
5 participants, of which 634 had COPD and 601 did not.

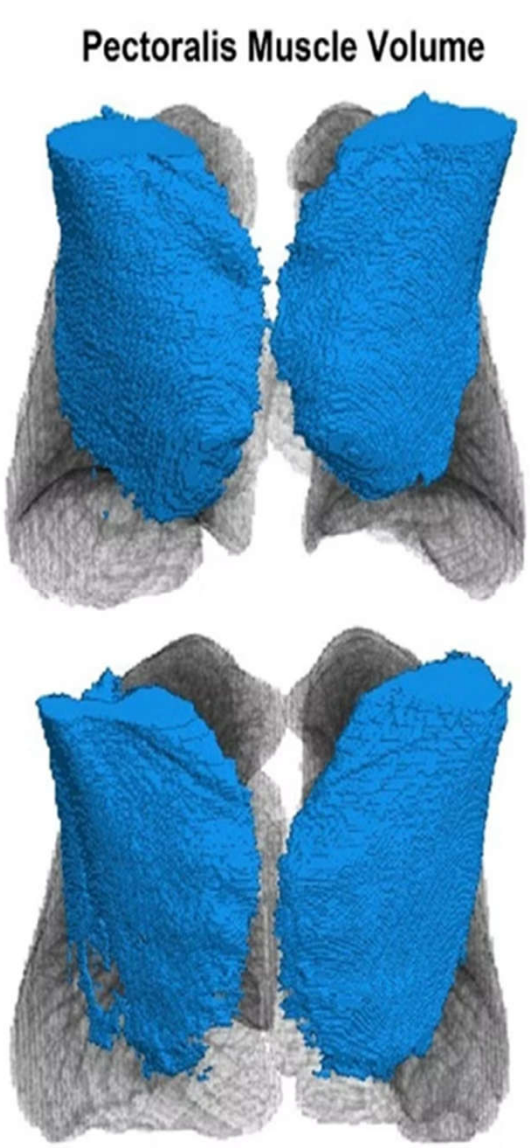
team developed a U-Net deep-learning model for PMV segmentation and applied rmation taken from the Canadian Cohort Obstructive Lung Disease (CanCOLD) st ch included data collected from November 2009 to July 2015. It used randomly sar scans from CanCOLD for model training (n = 96), for validation (n = 16), for inter ing (n = 32), and an external dataset for external testing (n = 32). The researchers tr differences between patients with or without COPD and associations with forced iratory volume in one second (FEV_1), diffusing capacity of the lungs for carbon noxide (Dlco), and peak oxygen uptake during exercise (VO_2).

nvestigators reported the following:

Performance of a deep-learning algorithm that segments pectoralis muscle volume for identifying sarcopenia

Type of dataset	Dice similarity coefficient
Training and validation	0.94
Internal testing	0.93
External testing	0.92

he team also found that both PMA and PMV were reduced in patients with COPD ($p < .05$) and that PMV was more strongly associated with FEV_1, Dlco, and VO_2 values.



Images show the pectoralis muscles of a h
male individual who never smoked (age, 66
years; height, 178 cm; body mass index [B
calculated as weight in kilograms divided b
height in meters squared], 28.4; number of
cigarette pack-years, 0; forced
expiratory volume in 1 second [FEV1], 97.6
predicted; FEV1: forced vital capacity [FVC
0.71; pectoralis muscle area [PMA], 59.4
cm2; pectoralis muscle volume [PMV], 764
and a male individual with a smoking histor
chronic obstructive pulmonary disorder (CO
(age, 66 years; height, 178 cm; BMI, 27.5;
number of cigarette pack-years, 43.2, FEV
predicted; FEV1:FVC, 0.56; PMA, 35 cm2;
480.8 cm3) from the Canadian Cohort
Obstructive Lung Disease (i.e., CanCOLD).
The CT image is shown in the axial plane.
PMV is automatically extracted using the
developed deep learning model and overla
onto the lungs for visual clarity.

ICAL NEWS | DIGITAL X-RAY

w-value x-ray persists in patients with maxillofac auma

Will Morton
Feb 17, 2026

n x-ray remains commonly used in initial imaging of adults with maxillofacial traun
ite clear guidelines favoring CT, according to a study published February 17 in *JAI*
ork Open.

n analysis of information from 281,421 patients in a U.S. national commercial claim
base, 72,125 (26%) received low-value plain x-rays of the nose, face, or orbit as the
al imaging, noted first author Gordon Wong, MBBS, of the University of Michigan
ical School in Ann Arbor, and colleagues.

geted interventions to reduce low-value imaging may improve diagnostic accuracy,
ce unnecessary costs, and advance value-based care," the group wrote.

al trauma is one of the most common reasons for emergency department visits. Low
itivity x-ray imaging in these patients offers limited diagnostic value and often fails
ct clinically significant injuries that would be identified by CT, the authors noted. E
American College of Radiology (ACR) and the American Society of Plastic Surgeon
mmend against the routine use of x-ray in maxillofacial trauma evaluation, they ad

etheless, plain x-ray remains in use, and in this study, the investigators aimed to inf
rts to reduce low-value care for maxillofacial trauma and promote evidence-based
ging practices.

researchers conducted a retrospective cohort study using data from the Merative
ketScan Commercial Claims and Encounters Database from January 2013 to Decem
2. The analysis included 281,421 adult patients (mean age, 38.9) with facial trauma
ived either a plain x-ray (nose, face, or orbit) or CT of the face or orbit within seven
of diagnosis.

rding to the results, one in four patients received low-value plain x-ray versus CT a
initial imaging study. Although plain x-ray use declined by nearly half over the nin
study period, its continued use had measurable consequences, with 5.5% of plain x
ients requiring subsequent CT and 7.6% of patients without an initial fracture diagn
riencing a diagnostic delay of more than three days, Wong and colleagues reported.

dition, women were 50% more likely than men to receive a plain x-ray, and urgent
gs had a 76% higher x-ray use than office-based settings.

se findings underscore a persistent gap between evidence-based practice and actual
cal imaging patterns in facial trauma care," the researchers wrote.

e the gradual decline of the use of x-ray during the study period demonstrates
ingful progress toward value-based imaging, as CT becomes more accessible, the
tion of guideline-concordant care must be prioritized, the group wrote.

geted interventions are needed: streamlined CT referral pathways for urgent care
gs, embedded decision-support tools in electronic health record systems, and cross
alty education on facial trauma imaging standards," the team suggested.

accompanying editorial, Chao Azad, MD, and Aviram Giladi, MD, of MedStar Un
orial Hospital in Baltimore, MD, wrote that by quantifying variations in care, the s
s an important contribution to the existing literature on clinical practice guidelines
Gs), specifically on gaps between CPGs and practice.

presents a meaningful opportunity for advancing value-based care," they wrote.

By HealthImaging

CAL NEWS | CT

uadruple low' PCCT protocol improves lung cancer aging

Kate Madden Yee

Feb 17, 2026

quadruple low" photon-counting CT (PCCT) protocol for lung cancer imaging proves image quality and reduces radiation dose exposure to the kidneys compare th conventional CT, according to a study published February 17 in *Radiology*.

e findings could translate to better care for patients who require repeated contrast nanced imaging, wrote a team led by Xiaofei Yang, MD, PhD, of the First Affiliated spital of Zhengzhou University in China.

We found that] compared with [traditional] CT, PCCT with a quadruple-low protoco luced the incidence of contrast-induced nephropathy and enhanced image quality d diagnostic confidence in imaging features in patients with lung cancer," the grou ted.

plays a critical role in lung cancer diagnosis and treatment monitoring, but traditio has well-known limitations, including lower spatial resolution and higher radiation se; PCCT has been shown to overcome these limitations, the researchers wrote.

a study that included 425 patients with lung cancer, the group compared the gnostic quality of chest CT images from PCCT using a quadruple-low protocol with t of traditional CT imaging. Patients underwent either exam between July and ptember 2024, and the PCCT protocol consisted of a 2 mL/sec injection rate and 1 /kg of 320 mg of iodine per milliliter. Two radiologists evaluated the exams' image ality and lesion imaging features, and assessed lesion and parenchymal metrics su attenuation, signal-to-noise ratio, and contrast-to-noise ratio.

e researchers reported the following:

CT reduced radiation dose by 55% with (3.49 mSv vs. 7.82 mSv; p < 0.001).

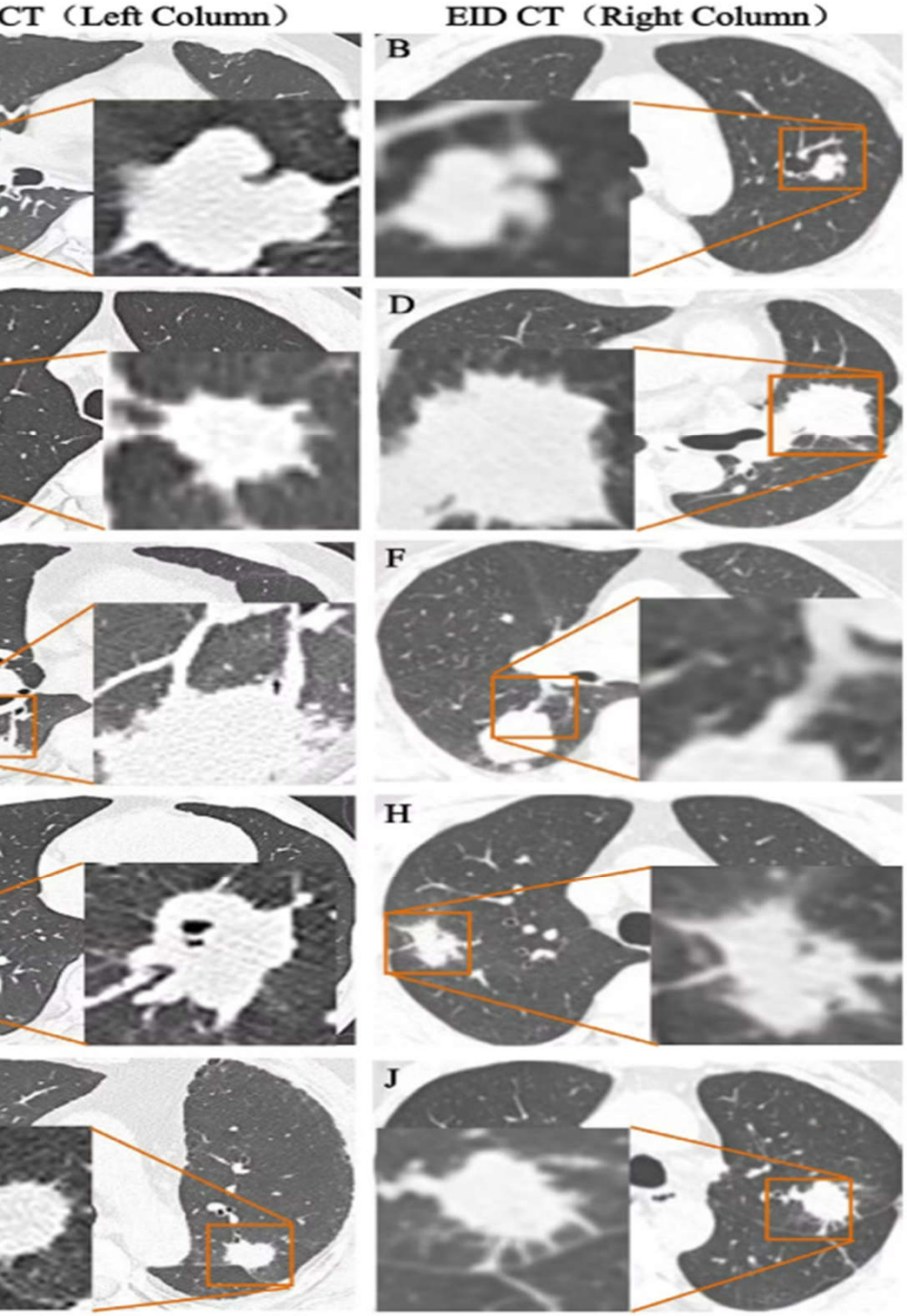
educed contrast load, with a 33% lower injection rate, 22% lower volume, d 9% lower concentration.

cases of contrast-induced nephropathy occurred in the PCCT group, mpared with 7.9% in the traditional CT group (p = 0.02).

CT showed higher signal-to-noise ratio and contrast-to-noise ratio for lung ions and parenchyma across noncontrast, arterial, and venous phases (all, p .001).

CT demonstrated superior subjective image quality, including sharpness, ifact reduction, and noise suppression (all p < 0.001).

CT elicited greater diagnostic confidence from the readers for key malignant tures such as lobulation, spiculation, pleural retraction, vascular nvergence, and vacuoles.



Representative imaging features of the lesion with energy-integra
detector (EID) CT and photon-counting CT (PCCT). (A) Unenha
image (left column) in a 56-year-old man with lung cancer and (B
image (right column) in a 73-year-old man with lung cancer depi
lobulation. (C) Unenhanced PCCT image (left column) in a 67-ye
with lung cancer and (D) EID CT image (right column) in a 71-y
woman with lung cancer depict spiculation. (E) Contrast-enhance
image (left column) in a 63-year-old man with lung cancer and (F
image (right column) in a 69-year-old woman with lung cancer d
convergence. (G) Unenhanced PCCT image (left column) in a 64
man and (H) EID CT image (right column) in a 49-year-old man
cancer depict vacuoles. (I) Unenhanced PCCT image (left colum
year-old man and (J) EID CT image (right column) in a 72-year-o
with lung cancer depict pleural retraction. The lung cancer lesion
specific imaging features are shown in the orange boxes. In brief,
with EID CT (B, D), PCCT provides superior visualization of co
(A) and thick strands extending from the lesion edge (C), thereby
the diagnostic confidence in identifying lobulation and spiculatio
convergence and vacuoles are clearly depicted on PCCT images (
they appear blurred or indiscernible on EID CT images (F, H). Ac
PCCT (I) shows clearer linear attenuation pulling of the fissure to
lesion compared with EID CT (J), potentially improving the diag
confidence in pleural retraction.