
Cite as: J. D. Cohen *et al.*, *Science*
10.1126/science.aar3247 (2018).

a c DNA, (11, 20). Ma 6, c, 6, a 6
a, 6, c, a, ca c, a, b, a-
c b, a, (25, 27). W, a, c, a-
a, a, a, 6b, c
a, a, ca c, 6, c b, ab, 41
> 10% a, c c, > 99%. W,
a, b, a, (ab, S3) a, a, a,
a, a, a, a, a, a, a, a,
a, a, a, ca c, a, W, a 39
c, b, c b 6, a, a, a,
a a6, a, a, a, a,
a a6 a, a, a, a, (ab, S3). E, 39,
b, a, c, a, 6, c, a, ca c, a-
a, a, 6 c, (ab, S3).
W, Ca c, SEEK 6 1,005 a,
a b, a, S a, I III ca c, a, 6,
ac, a, c, a, a, c, c, c,
b, a, N, a, c, a, a, a, c, a 6,
b, a, c, c, a, a, a, a,
a a, a, 6, 6. T, a, a, a, a,
a 64 (a, 22, 93). T, ca c, 6,
c, b, ca, 6 a, c, a, a,
b, ca, b, ba, a, c, a,
c, c, ca, T, a, ca a, c, ca c, a-
ac, c, a, a, a, a, ab, S4. T,
c, a, a, a, a, a, A, ca J
C, Ca c, (AJCC) a, II, acc, 49%
a, a, a, a, a, a, a, a, I
(20%), a, III (31%), a, T, b, a,
a, ac, 6, a, ab,
SII. T, a, 6 c, c, c, 812, a,
a, a, 55 (a, 17, 88), 6,
ca c, a, 6, a, a, a, c, c,
6, a,
Ca c, SEEK, a, a, 8, a, a,
c, a, 2,001, c, ac, c,
c, b, a, a, a6 (ba, b-
a, a, a6, a, a, a, a, 6,
a, a, a, a, a, a, I, a,
a, a, 6, a, ca,
acc, ac6, W, a, a-
a, a, a, c, a, a, c, a,
a, a, a, acc, b, a, a a,
b, a, c, Ca c, SEEK,
(S, a, 6 Ma, a). T, a, a, c-
c, a, b6, a, 10- c,
a, a, T, c, a, c, a, ac, c (ROC)
c, a, c, a, a, c,
a, a, a, F 2A.
T, a, 6, Ca c, SEEK a

ca c, 6, a, a, a 70% ($P < 10^{-96}$), b, a
) a, a, 98%, a, a, ca c, 33%
b, a, ca c, (F 2C). A, 6, c, c 6 a
> 99%; 67, 812, a, ca -
c, c, W, c, b, c, a, a, 6 c -
a, a, a, a, a, a, c, ca c, b,
c a 6, a, a, a, 6, c, ca c, b,
a, a, ac, c a, ca, a, a,
a a.
T, a, a, a, a, a,
a, a, c, a c DNA, a,
b6, a, ca c, a, 125 (CA-125), ca, c, b 6-
c a, (CEA), ca c, a, 19-9 (CA19-9), ac
(PRL), a, c6, ac, (HGF), (OPN),
6, a, (MPO), a, b, a,
a, 1 (TIMP-1), (ab, S9). Wa, a,
ac, c DNA a, a, a, Ca -
c, SEEK, a, b, a, a,
a, ca c, (S2). T, a, c, a,
c DNA a, a, Ca c, SEEK a,
ab, S9 a, a, c, a, c, a a 6, a6-
c, c, S3. T, c, a, a, c, c,
a, a, a, a, a, a,
a, a, a, a, ab, S5 a, S6. T, b-
ab, c, a, a, c, a, a, ac,
a, ca a a, 6, Ca c, SEEK, S4; ac,
c, c, a, a, c, a, a 6,
O, a, a, b, a, c, c,
ab 6, c, ca c, a, a, 6, a 6, a, T,
a, 6, Ca c, SEEK a 73%, c -
a, a, a, (S a, II), a, (78%), S a, III
ca c, a, (43%), S a, I ca c, (F 2B). T,
6, a, a, ca c, (S a, I) a, c,
ca c, (100%) a, a, a, ca c,
(20%).

O, a, b, ab, 6, ca, c, 6, a, T, a, Ca, c, SEEK, ca, 6, a, ca, c, ac, a, c, Ca, c, SEEK, T, a, acc, c, DNA, a, b, a, a, a, a, (S, a, 6, Ma, a), O, a, a, c, ca, c, a, a, a, Ca, c, SEEK, W, a, a, a, c, ca, c, a, c, 6, b, a, a, c, W, a, (S, a, 6, Ma, a), 6, 626, ca, c, a, c, Ca, c, SEEK, T, W, a, 6, c, ca, a, ab, a, ab, ca, 83%, a, (F, 3, ab, S8; $P < 10^{-77}$), b, a,). E, ab, ca, 63%, a, (F, 3, ab, S8; $P < 10^{-47}$), b, a,). G, a, a, a, a, 6, a, a, a, a, a, T, acc, ac6, a, c, a, 6, a, c, a, c, (F, 3, a, ab, S10), I, a, 6, a, a, a, a, 6, b, a, ca, c, c, c, c, 6, T, a, a, a, c, b, c, 6,

- T8)-1TSa1-Y-Sc161B0424((2014)9SJ01670a.5

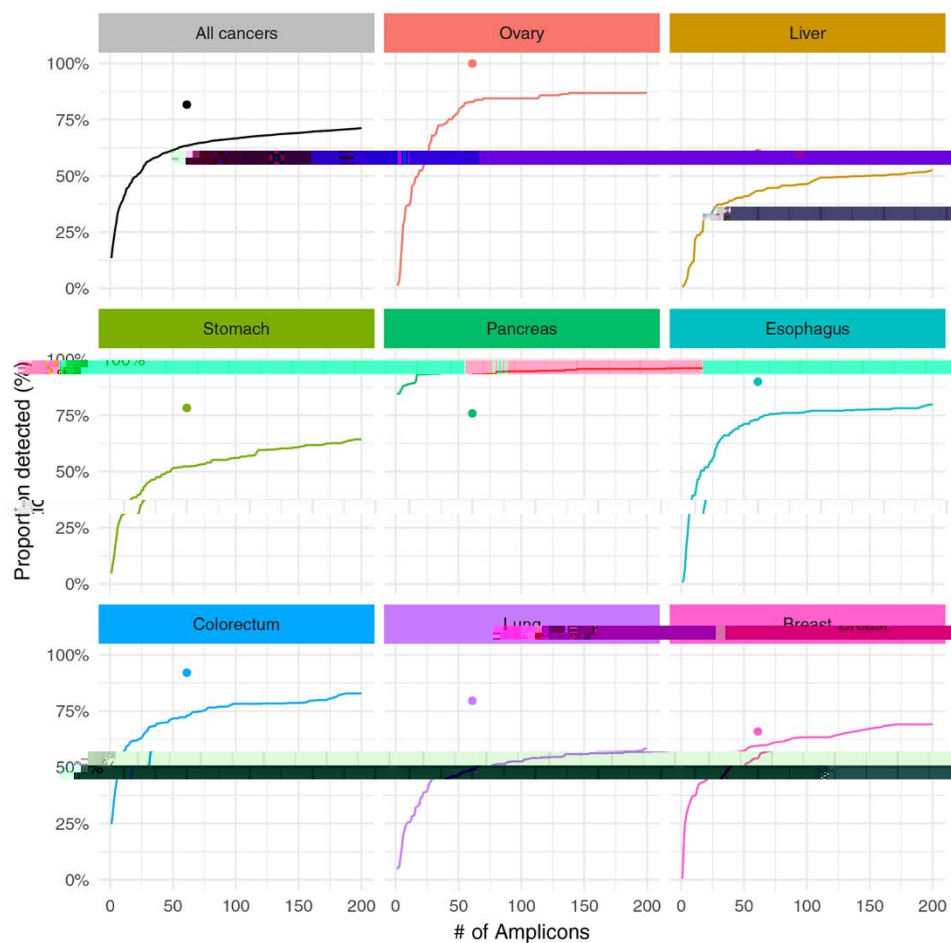


Fig. 1. Detection of a PCR-based assay for various cancers. The assay was evaluated for its ability to detect specific mutations in a panel of 9 cancer types. The detection rate was measured as the proportion of samples in which the mutation was detected. The curves show the proportion of samples in which the mutation was detected as a function of the number of amplicons. The curves are generally sigmoidal, indicating that the detection rate increases rapidly at first and then plateaus as the number of amplicons increases. The curves for 'All cancers' and 'Ovary' show the highest detection rates, while the curves for 'Lung' and 'Breast' show the lowest detection rates.

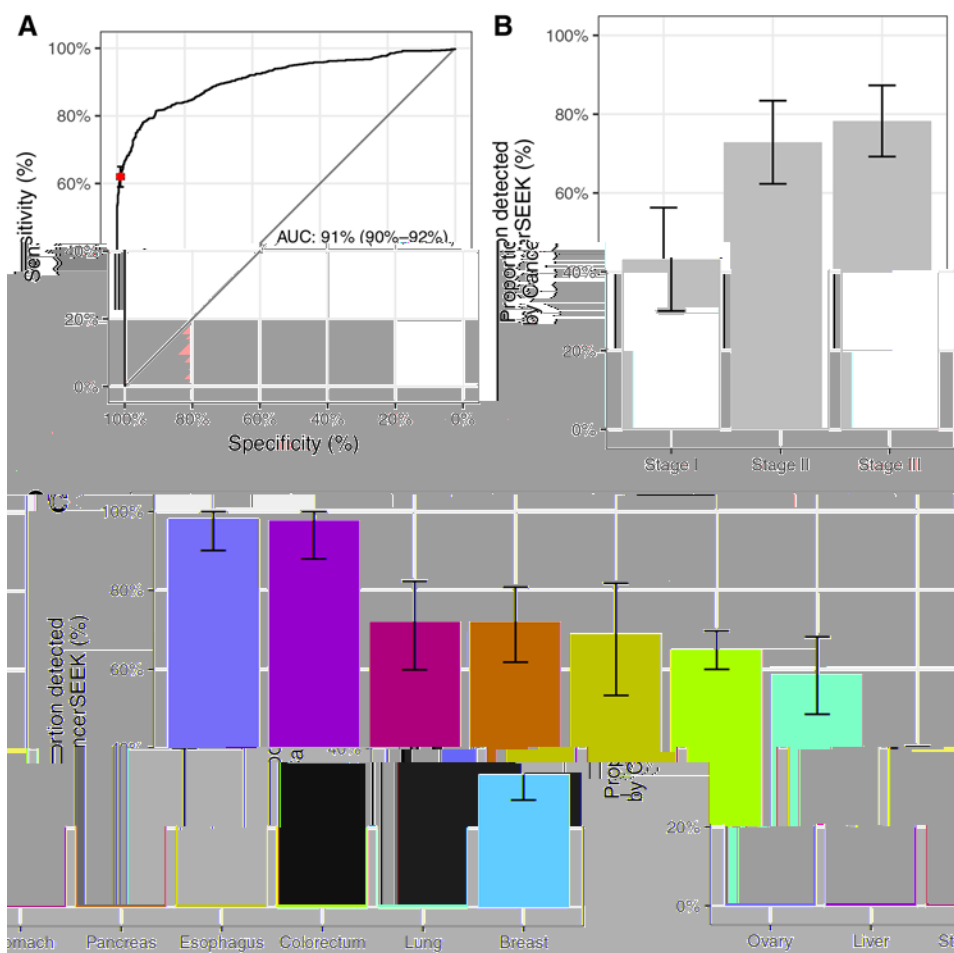


Fig. 2. Performance of CancerSEEK. (A) Receiver operating characteristic (ROC) curve of CancerSEEK. The red line indicates the expected performance of a random classifier (62%).



Detection and localization of surgically resectable cancers with a multi-analyte blood test

Joshua D. Cohen, Lu Li, Yuxuan Wang, Christopher Thoburn, Bahman Afsari, Ludmila Danilova, Christopher Douville, Ammar A. Javed, Fay Wong, Austin Mattox, Ralph. H. Hruban, Christopher L. Wolfgang, Michael G. Goggins, Marco Dal Molin, Tian-Li Wang, Richard Roden, Alison P. Klein, Janine Ptak, Lisa Dobbyn, Joy Schaefer, Natalie Silliman, Maria Popoli, Joshua T. Vogelstein, James D. Browne, Robert E. Schoen, Randall E. Brand, Jeanne Tie, Peter Gibbs, Hui-Li Wong, Aaron S. Mansfield, Jin Jen, Samir M. Hanash, Massimo Falconi, Peter J. Allen, Shibin Zhou, Chetan Bettegowda, Luis Diaz, Cristian Tomasetti, Kenneth W. Kinzler, Bert Vogelstein, Anne Marie Lennon and Nickolas Papadopoulos

published online January 18, 2018

ARTICLE TOOLS

<http://science.sciencemag.org/content/early/2018/01/17/science.aar3247>

SUPPLEMENTARY MATERIALS

<http://science.sciencemag.org/content/suppl/2018/01/17/science.aar3247.DC1>

RELATED CONTENT

<http://science.sciencemag.org/content/sci/359/6373/259.full>

REFERENCES

This article cites 35 articles, 14 of which you can access for free
<http://science.sciencemag.org/content/early/2018/01/17/science.aar3247#BIBL>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title Science is a registered trademark of AAAS.