IN THE NAME OF GOD

دانشگاه علوم پزشکی و خدمات بهداشتی، درمانی ایران

Oncology and Artificial Intelligence

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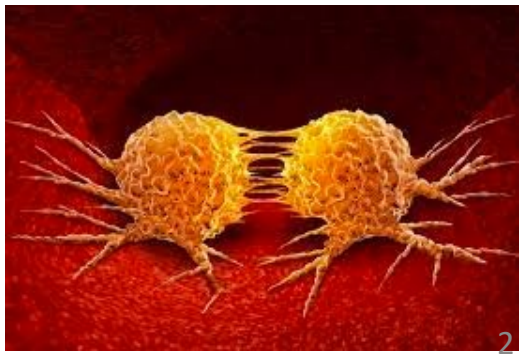
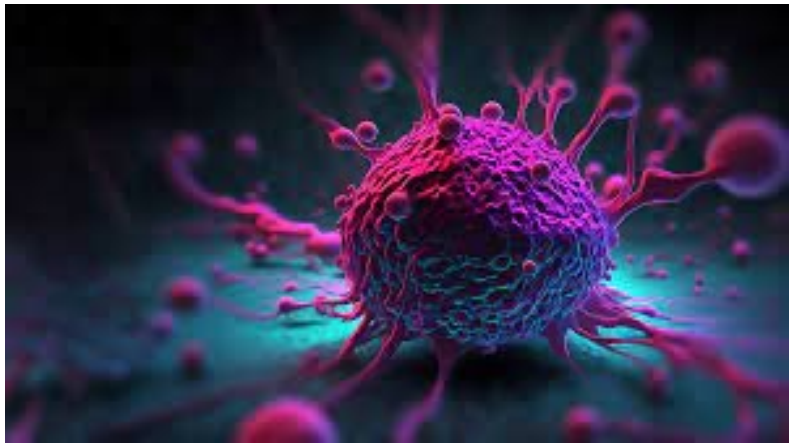
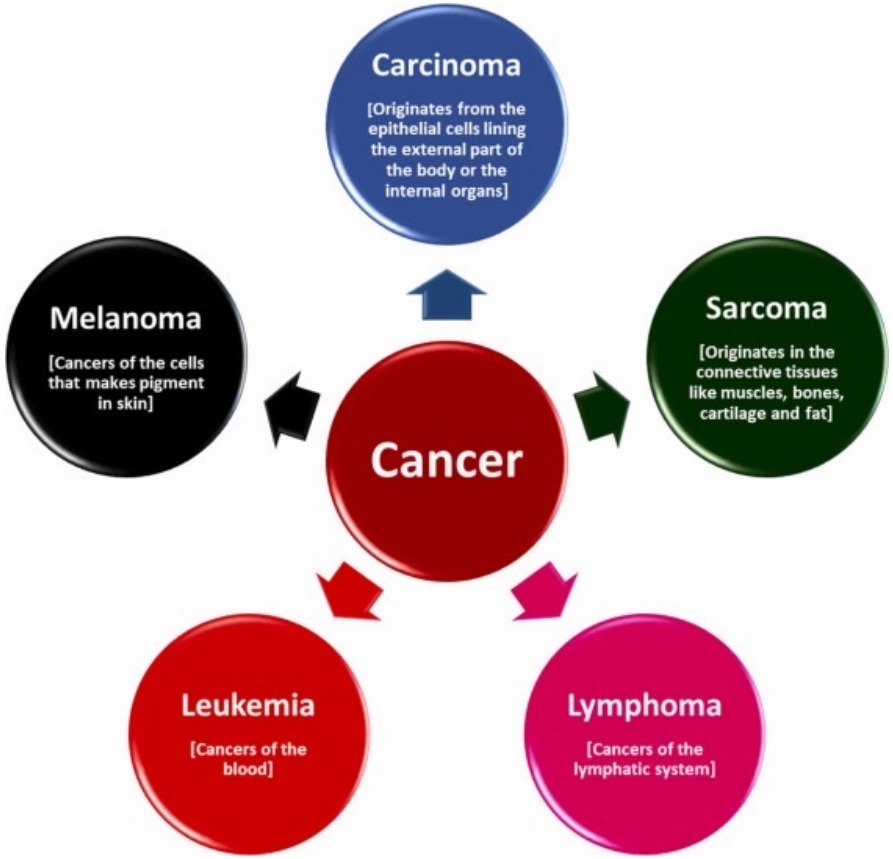
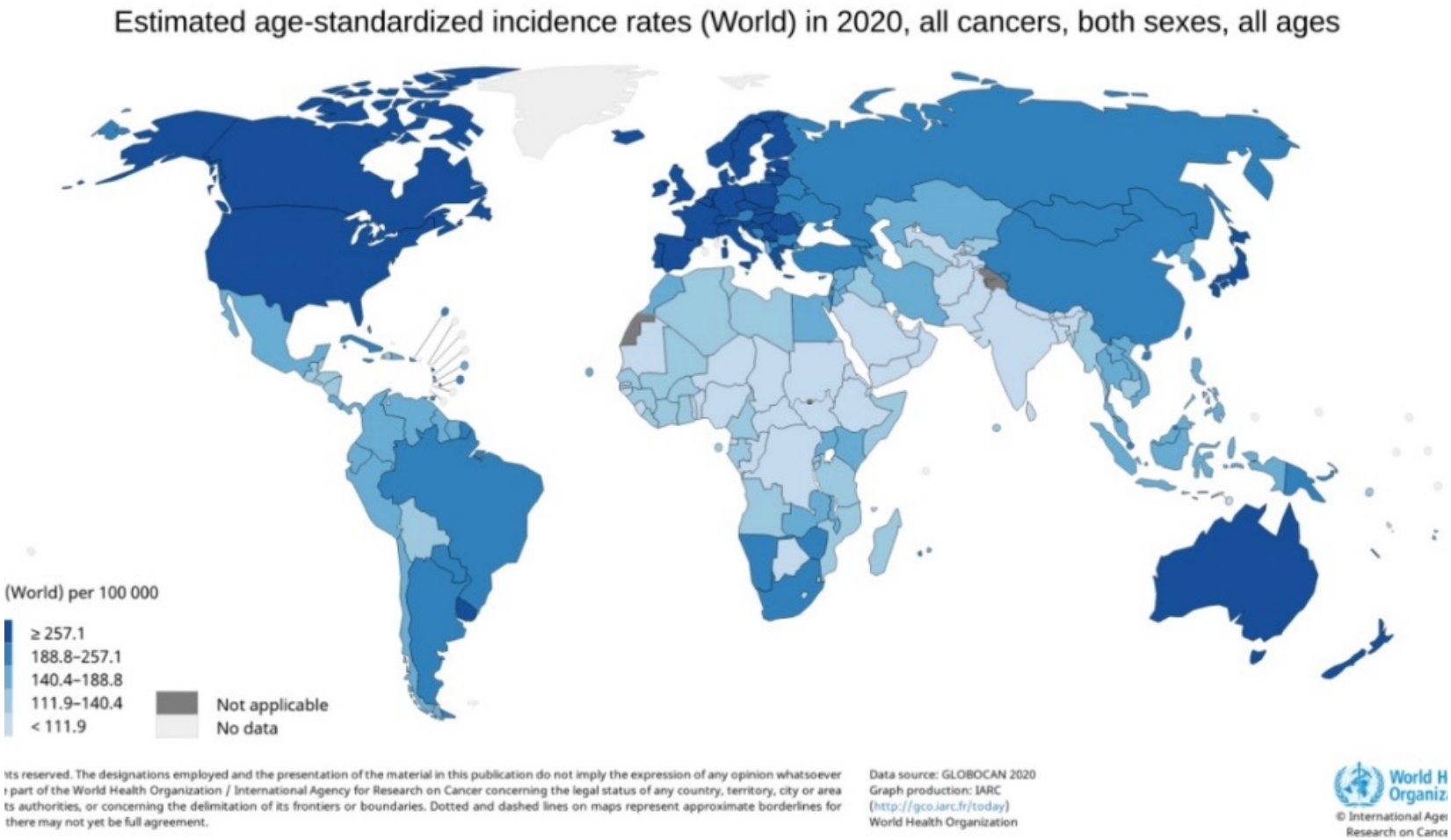


Cancer and Oncology







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ts authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate borderlines for
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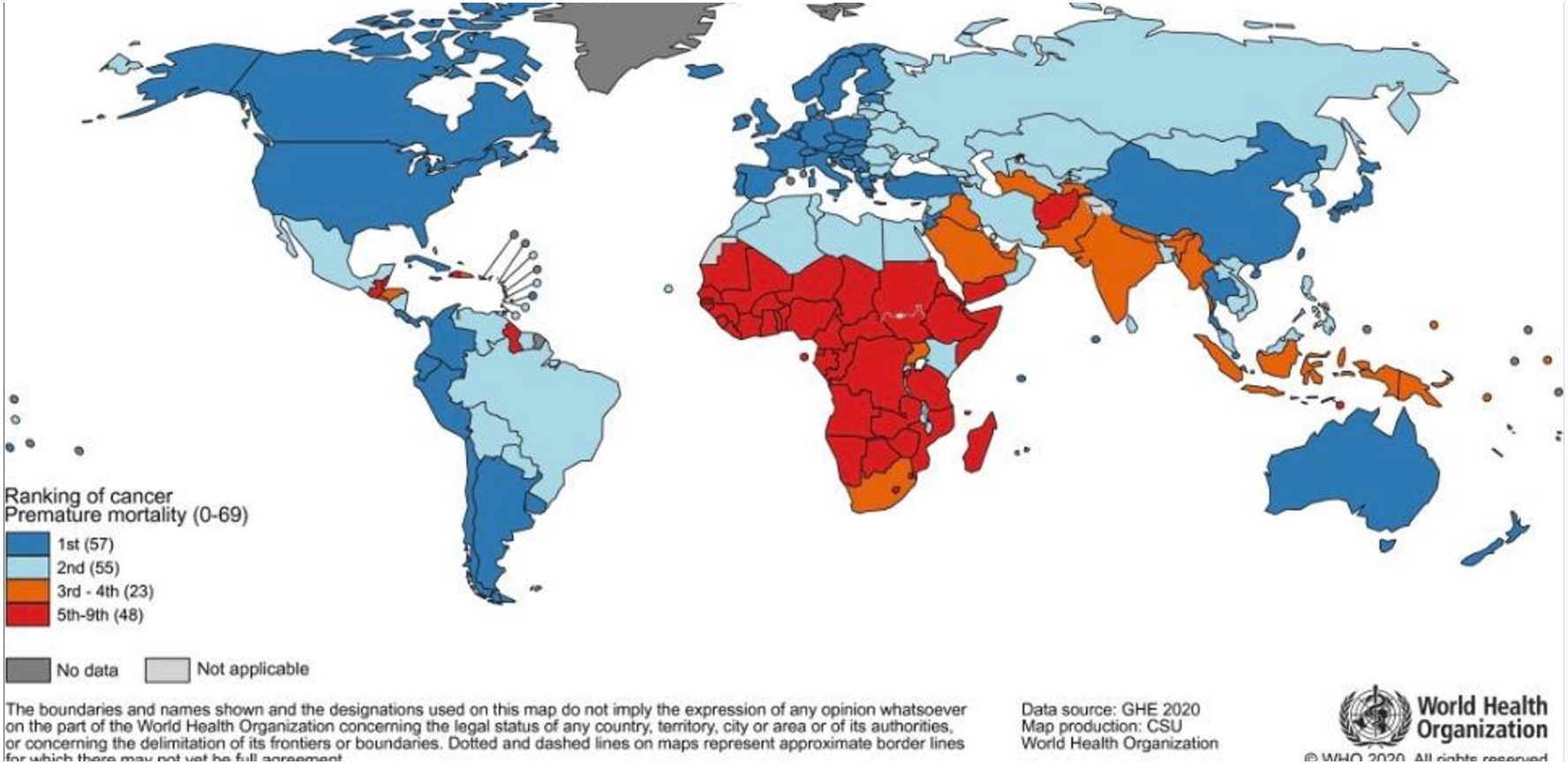
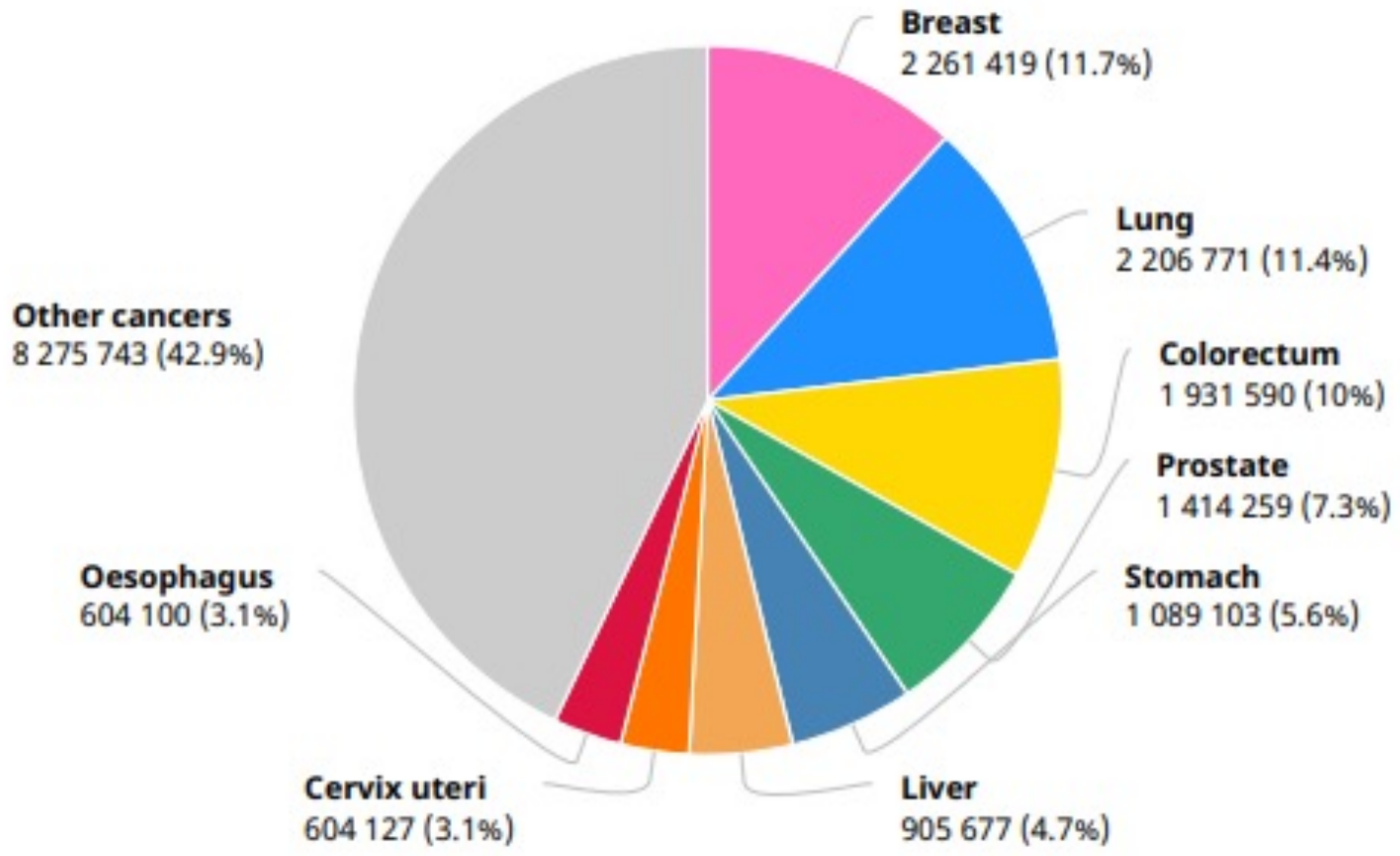
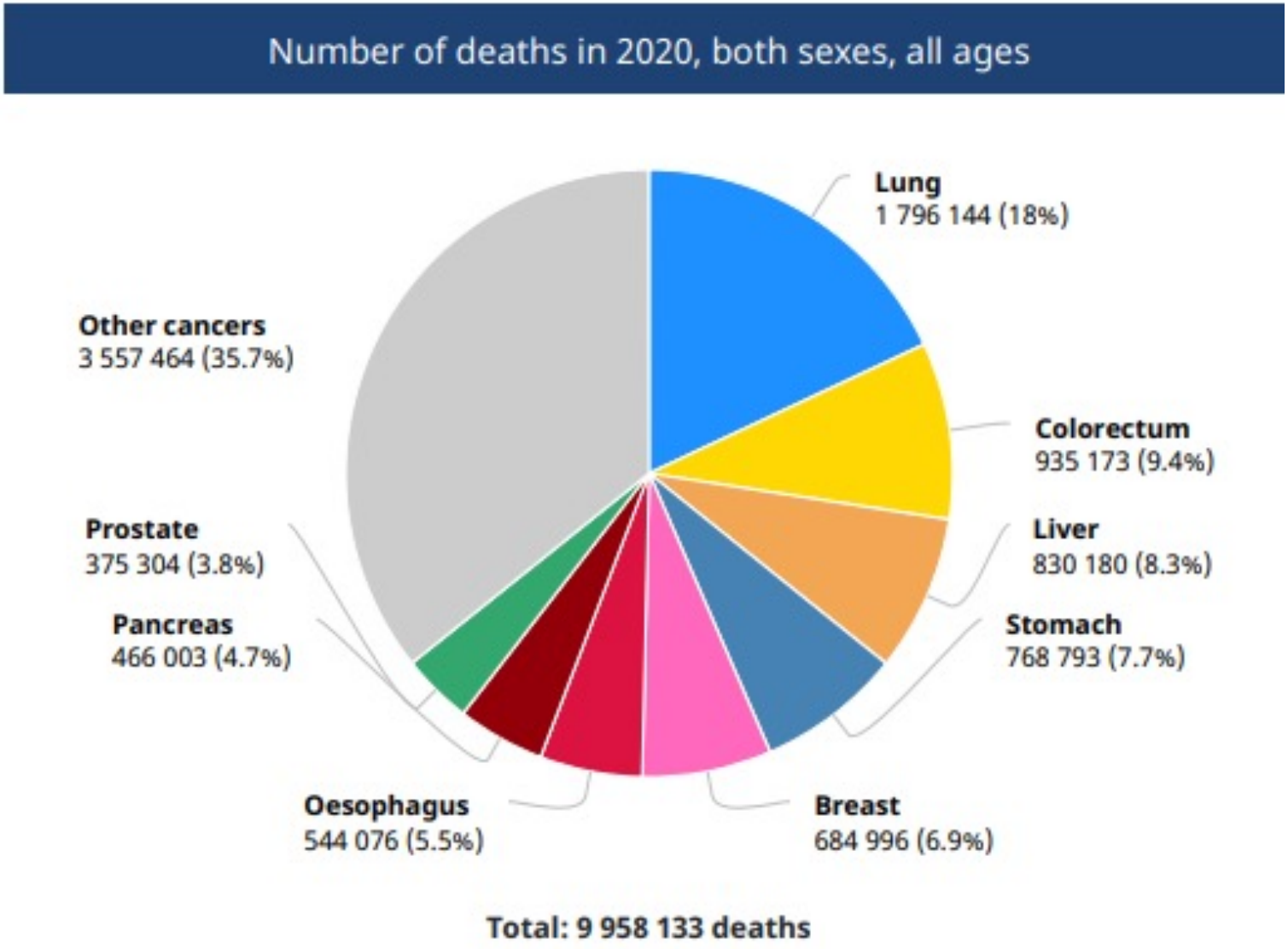
Research on Canc


Ranking of cancer
Premature mortality (0-69)
1st (57)
2nd (55)
3rd - 4th (23)
5th-9th (48)
No data
Not applicable
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines
Data source: GHE 2020
Map production: CSU
World Health Organization
World Health Organization

Number of new cases in 2020, both sexes, all ages



Total: 19 292 789 cases


Number of deaths in 2020, both sexes, all ages
Lung
1 796 144 (18%)
Colorectum
935 173 (9.4%)
Liver
830 180 (8.3%)
Stomach
768 793 (7.7%)
Breast
684 996 (6.9%)
Oesophagus
544 076 (5.5%)
Pancreas
466 003 (4.7%)
Prostate
375 304 (3.8%)
Other cancers
3 557 464 (35.7%)
Total: 9 958 133 deaths

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Numbers at a glance

Total population

83 992 953

Number of new cases

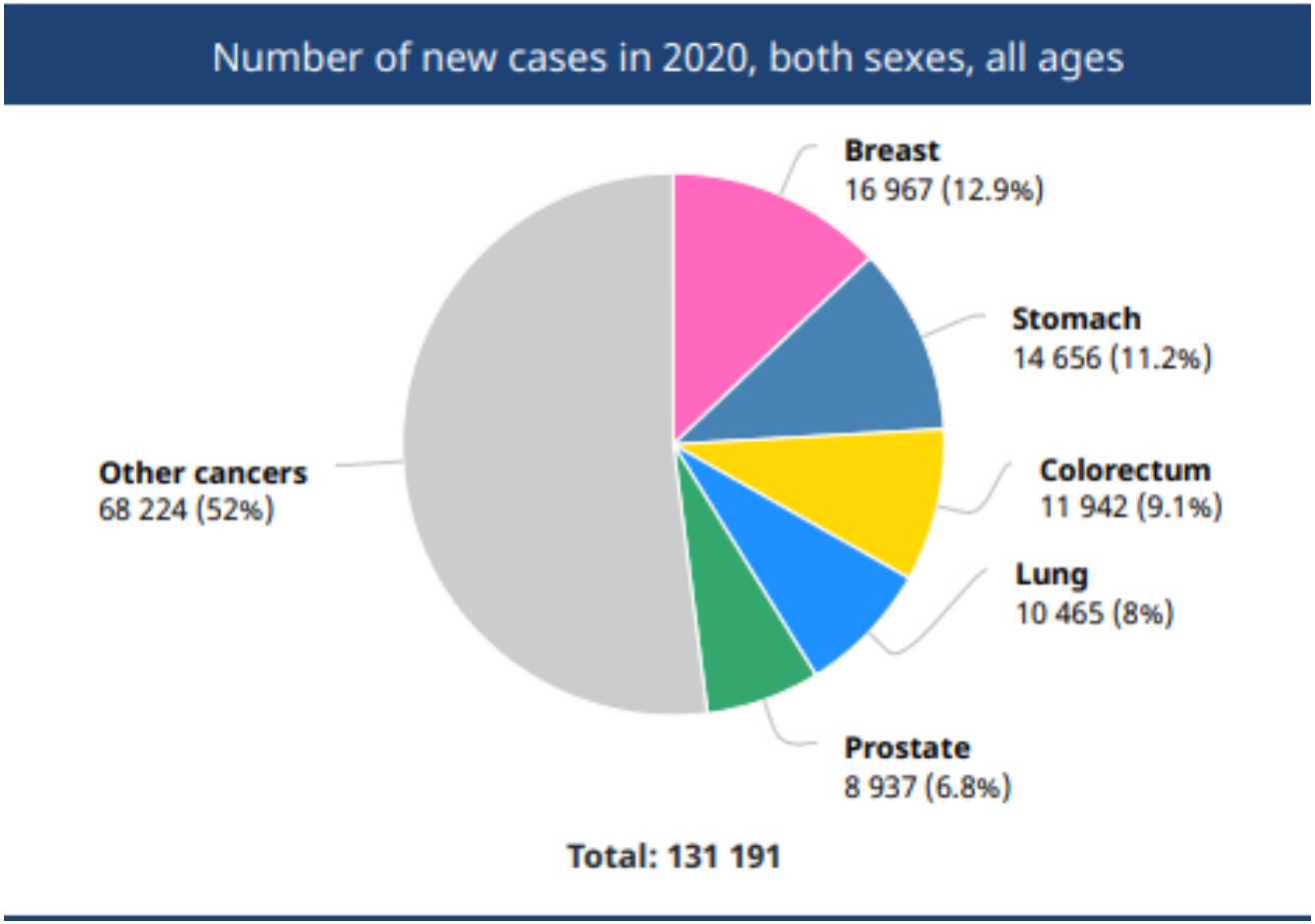
131 191

Number of deaths

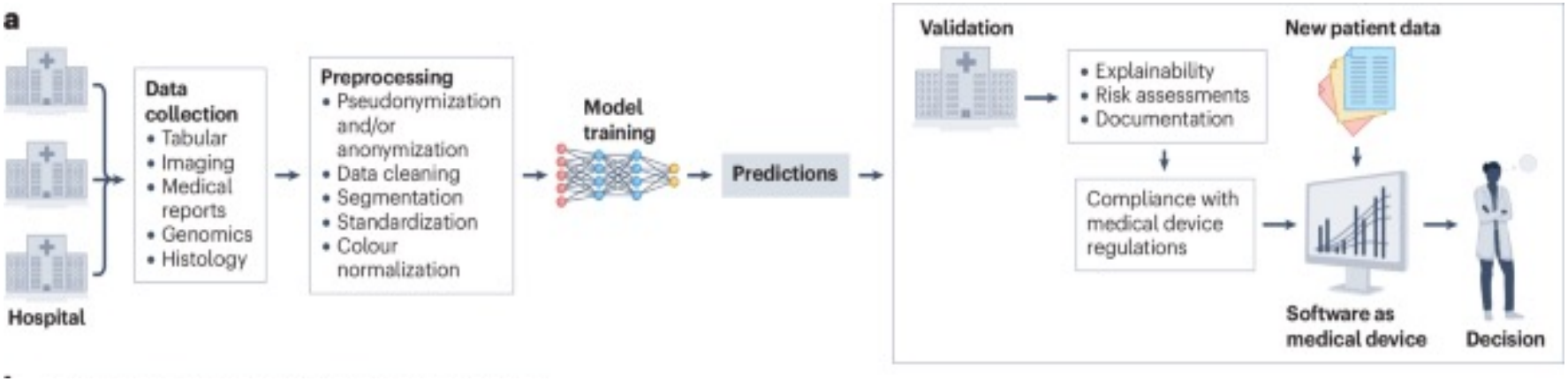
79 136

Number of prevalent cases (5-year)

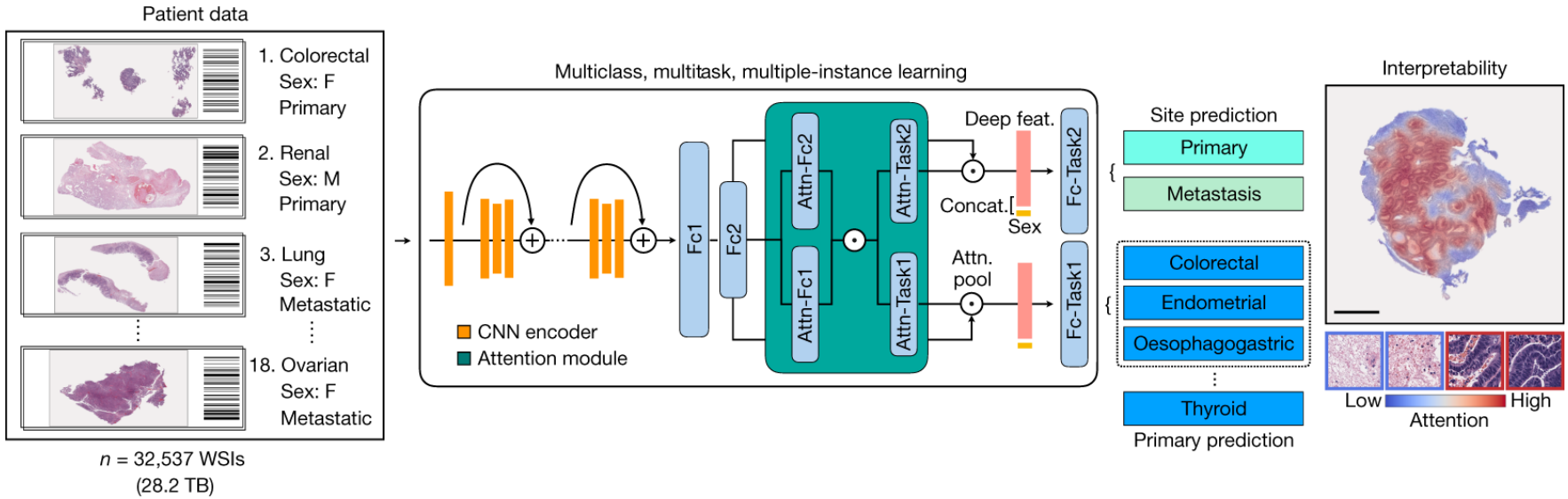
319 740


Number of new cases in 2020, both sexes, all ages
Breast
16 967 (12.9%)
Stomach
14 656 (11.2%)
Colorectum
11 942 (9.1%)
Lung
10 465 (8%)
Prostate
8 937 (6.8%)
Other cancers
68 224 (52%)
Total: 131 191

AI in Cancer

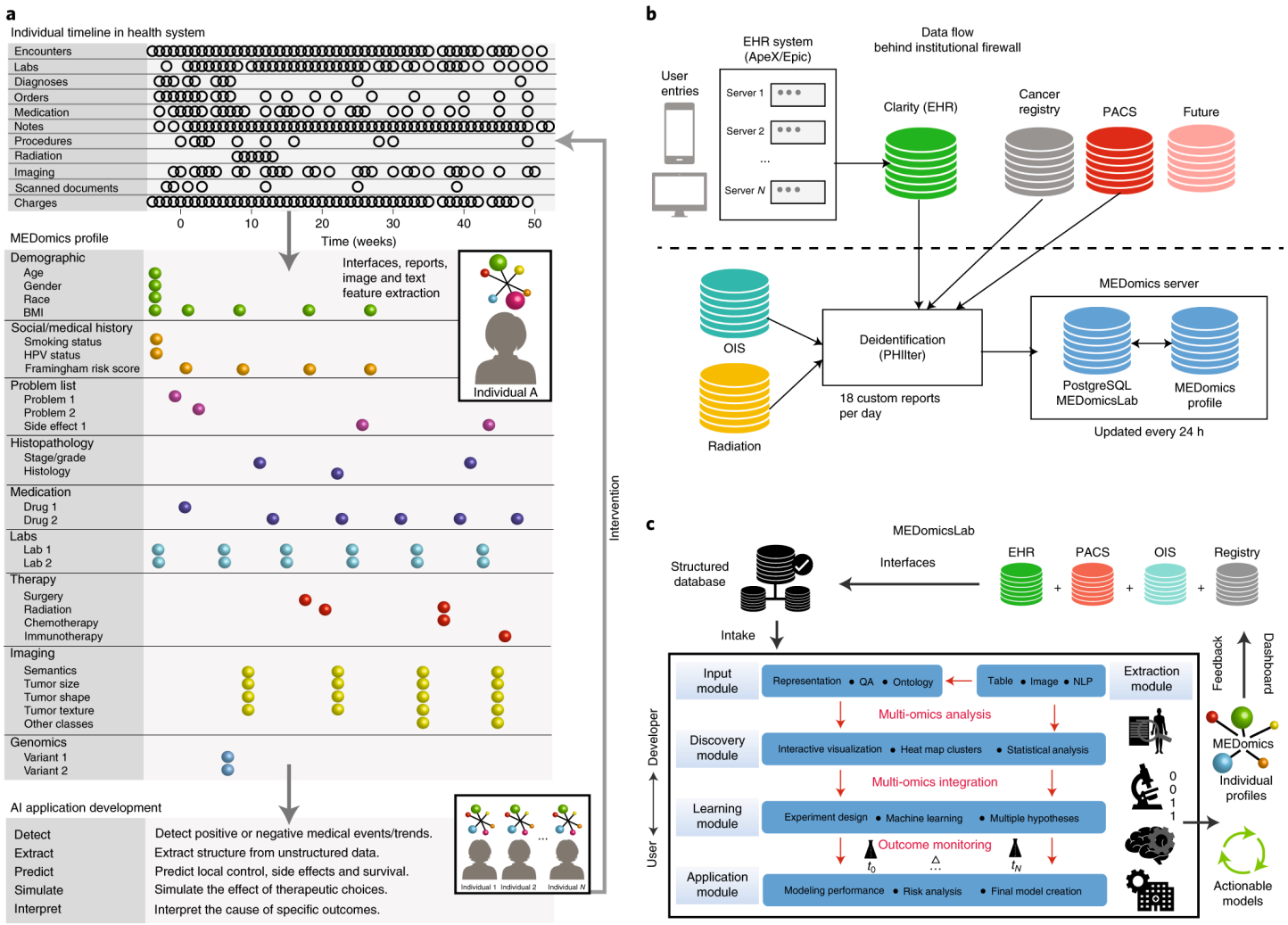

a
Hospital
Data collection
• Tabular
• Imaging
• Medical reports
• Genomics
• Histology
Preprocessing
• Pseudonymization and/or anonymization
• Data cleaning
• Segmentation
• Standardization
• Colour normalization
Model training
Predictions
Validation
• Explainability
• Risk assessments
• Documentation
Compliance with medical device regulations
New patient data
Software as medical device
Decision

AI-based pathology predicts origins for cancers of unknown primary



Nature **volume 594**, pages106–110 (2021)

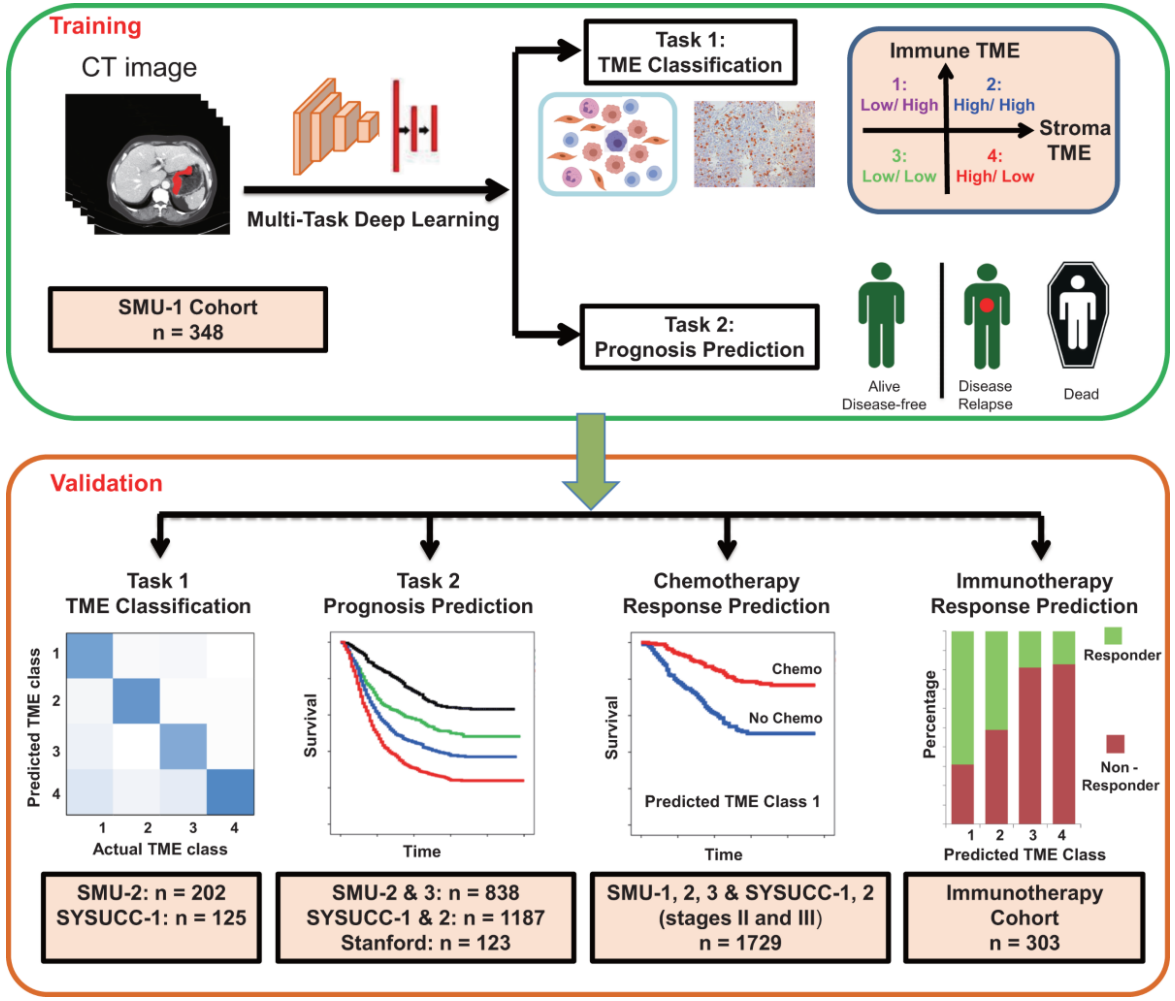
An artificial intelligence framework integrating longitudinal electronic health records with real-world data enables continuous pan-cancer prognostication



Nature Cancer **volume 2**, pages709–722 (2021)

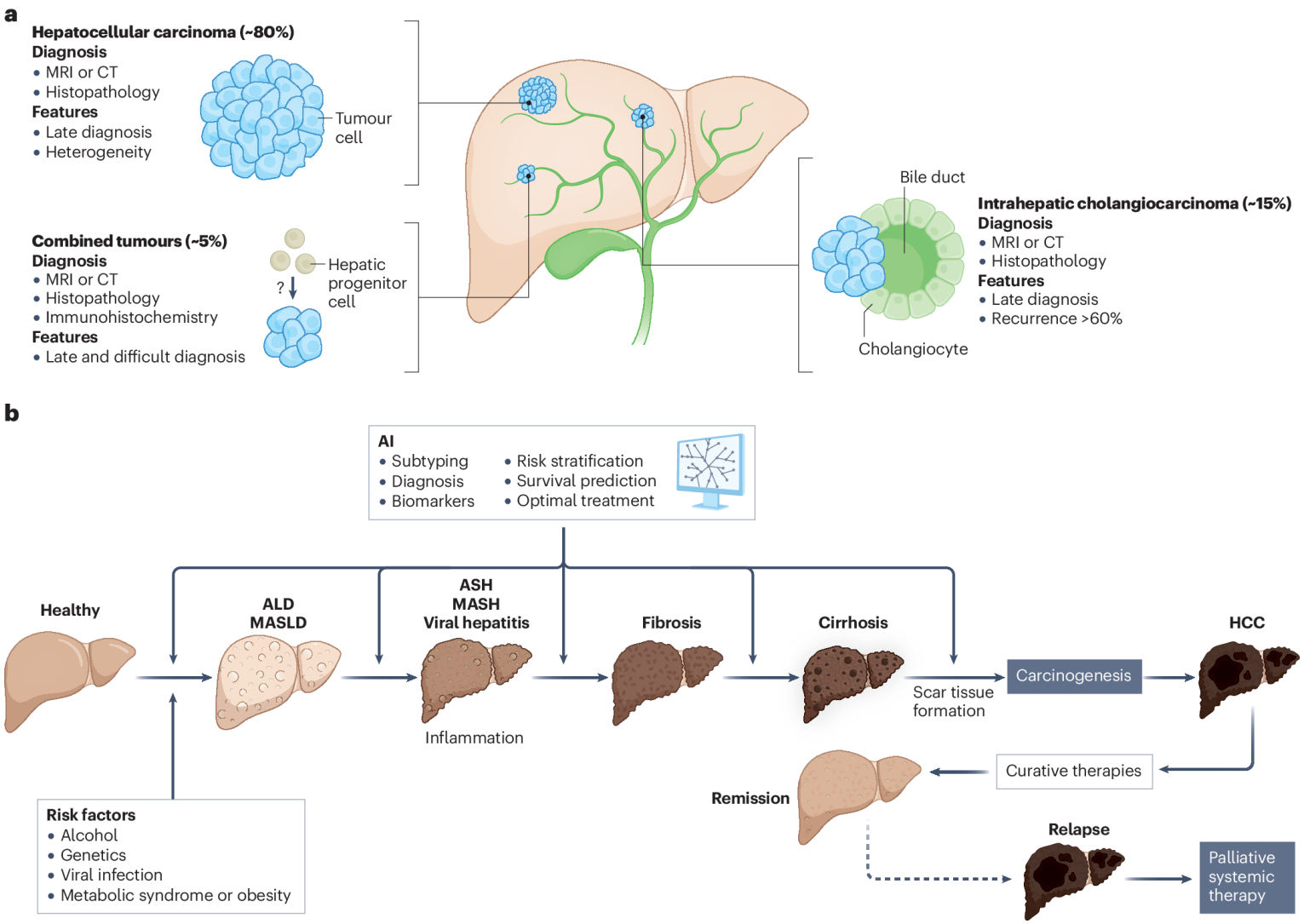
Biology-guided deep learning predicts prognosis and cancer immunotherapy response

TME (tumor microenvironment)



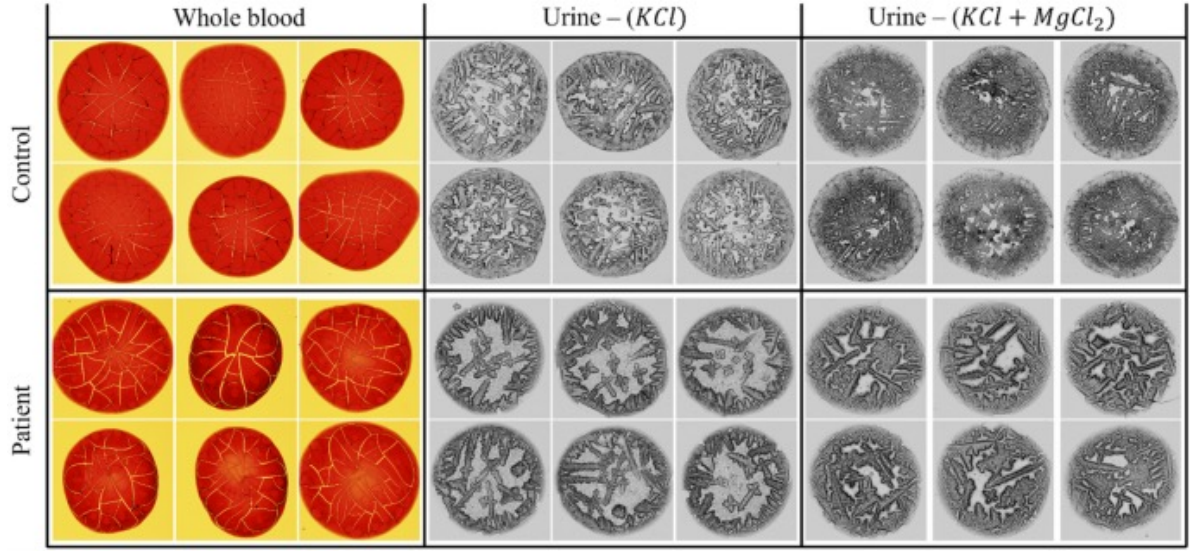
Nature Communications **volume 14**, Article number: 5135 (2023)

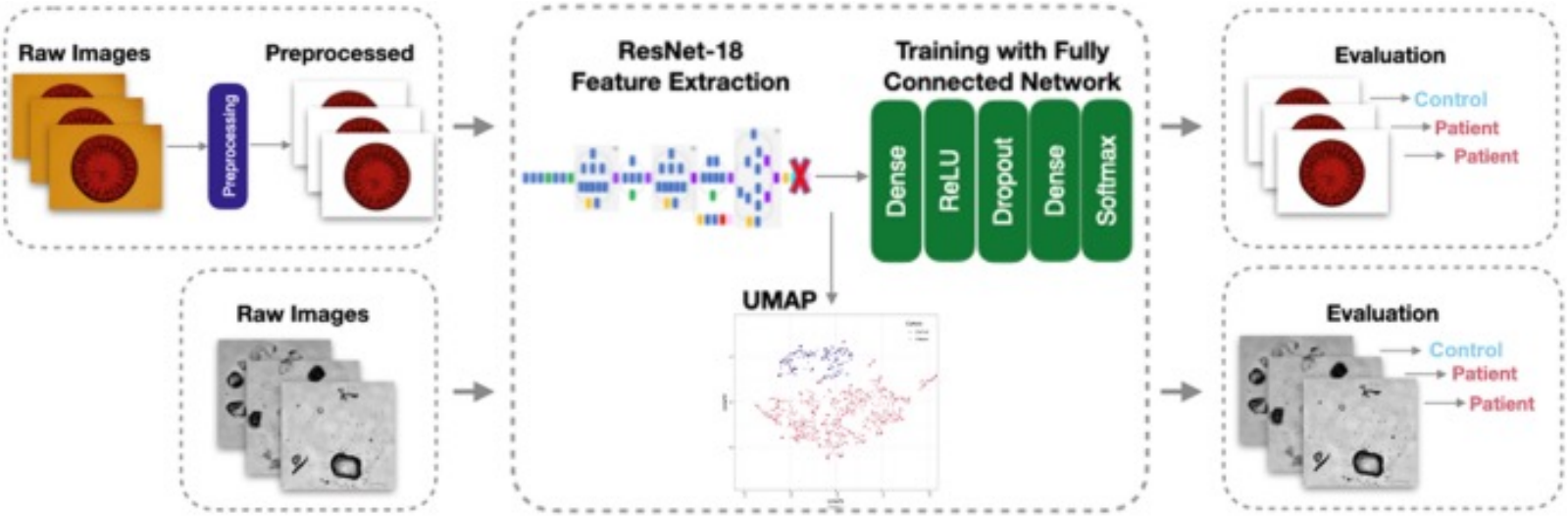
Artificial intelligence in liver cancer — new tools for research and patient management



Nature Reviews Gastroenterology & Hepatology (2024)

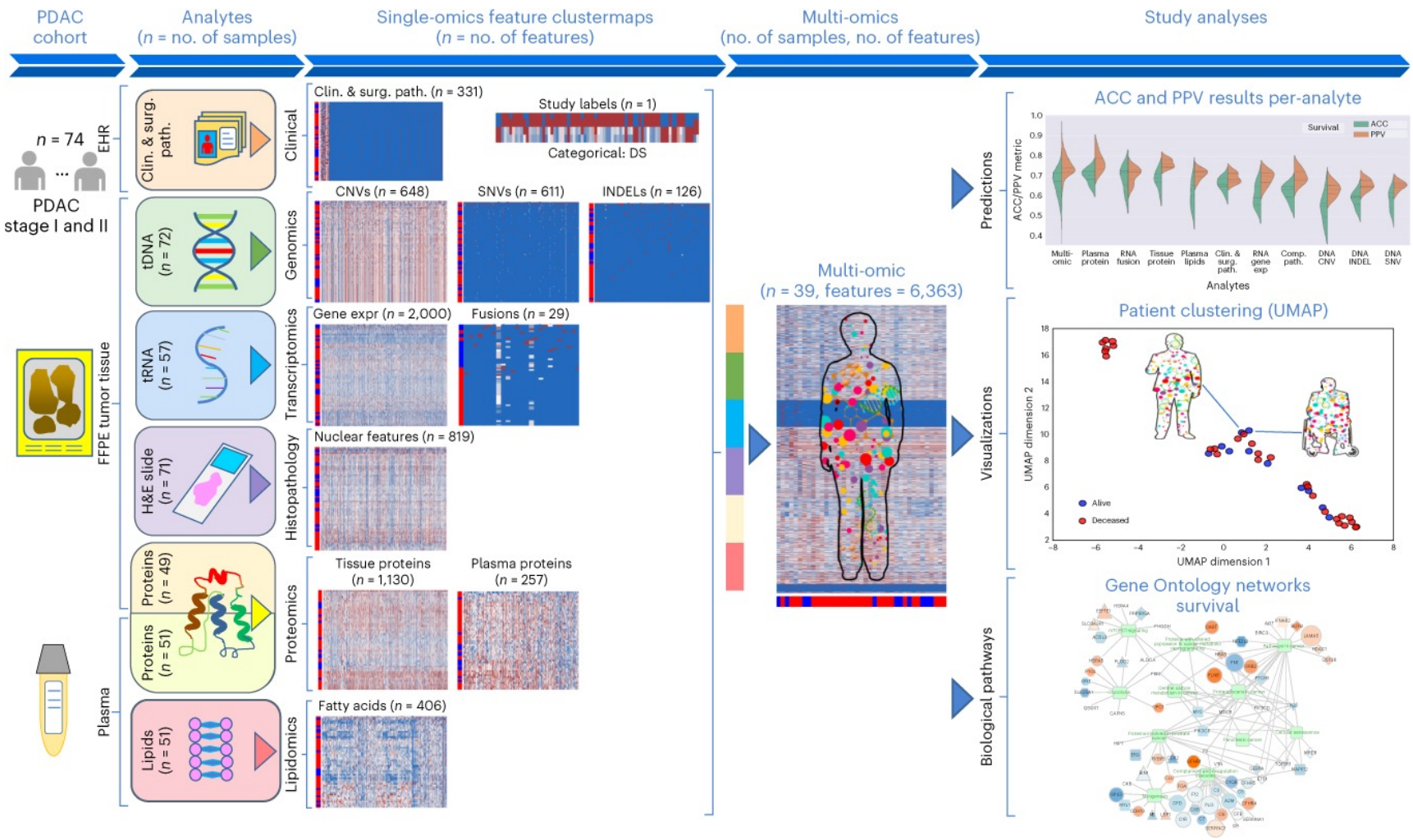
Artificial intelligence assisted patient blood and urine droplet pattern analysis for non-invasive and accurate diagnosis of bladder cancer





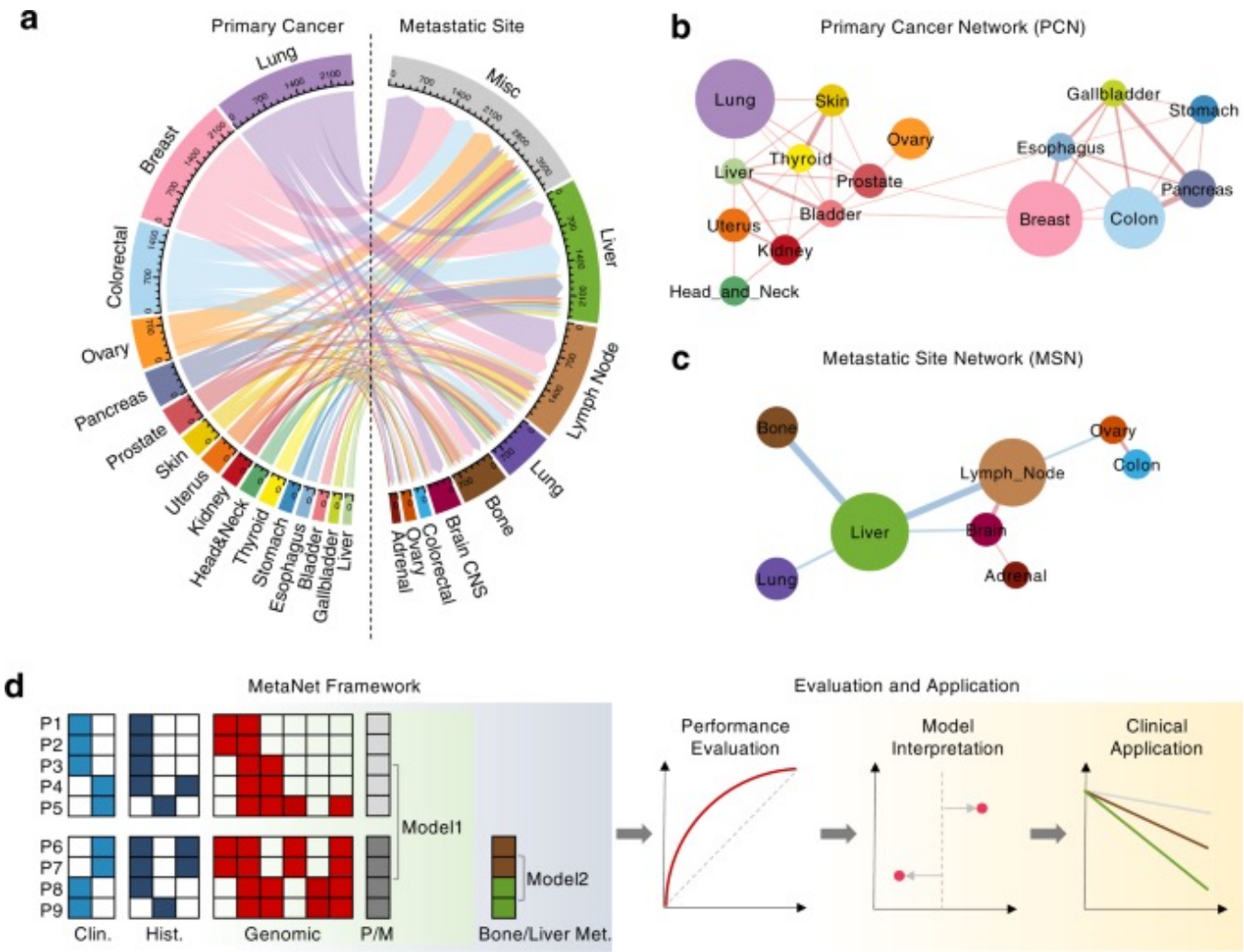
Scientific Reports **volume 14**, Article number: 2488 (2024)

Artificial intelligence uses multiomic data to predict pancreatic cancer outcomes



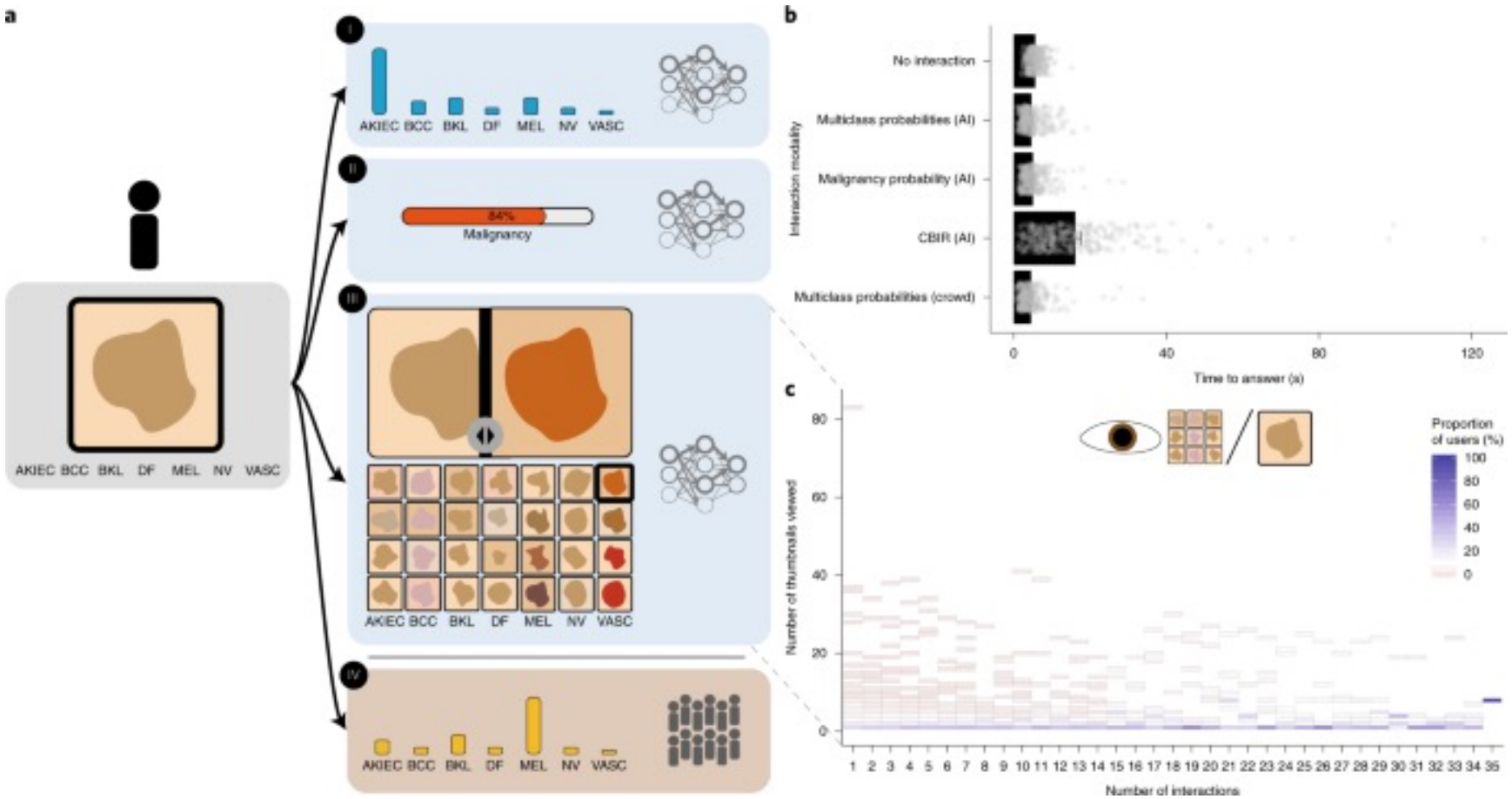
Nature Cancer **volume 5**, pages226–227 (2024)

Machine learning of genomic features in organotypic metastases stratifies the progression risk of primary tumors



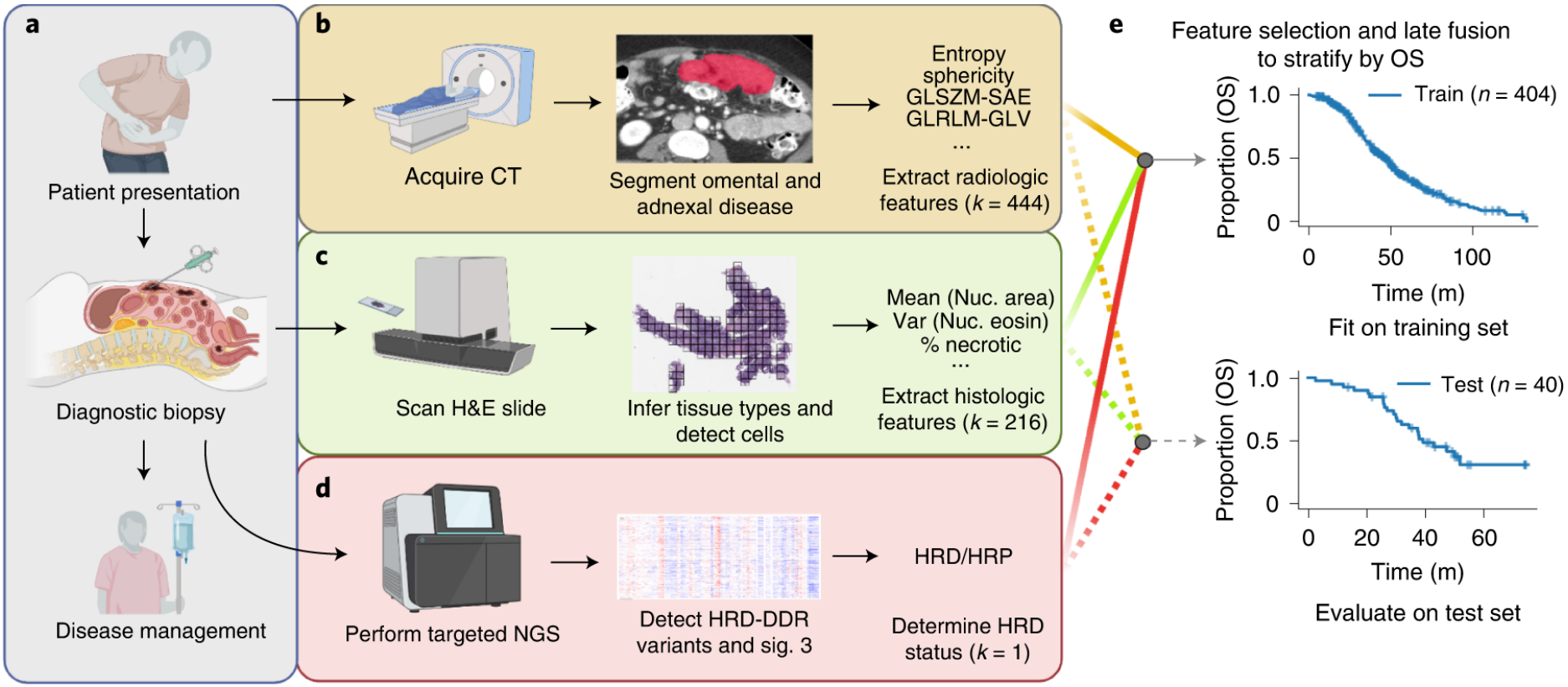
Nature Communications **volume 12**, Article number: 6692 (2021)

Human–computer collaboration for skin cancer recognition



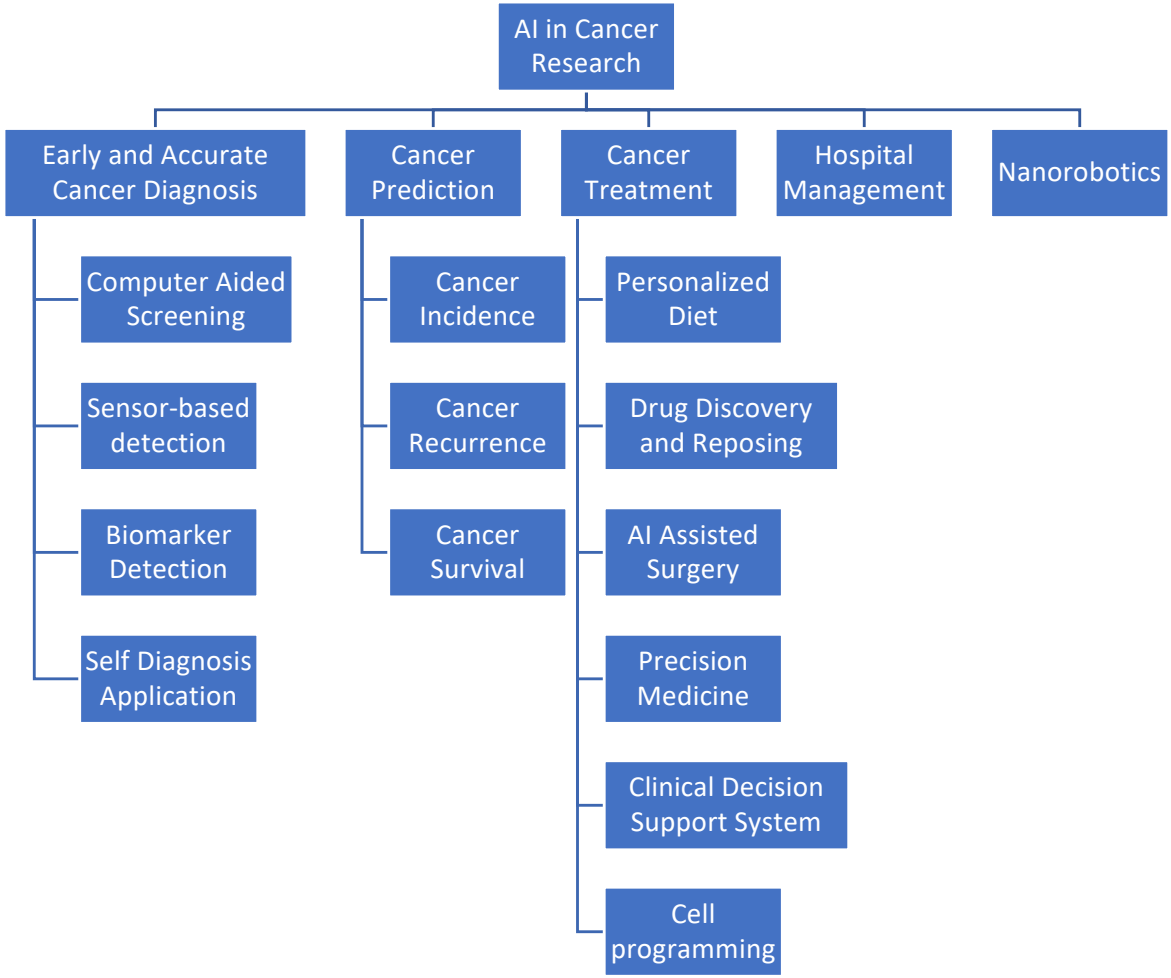
Nature Medicine **volume 26**, pages1229–1234 (2020)

Multimodal data integration using machine learnir improves risk stratification of high-grade serous ovarian cancer



Nature Cancer **volume 3**, pages723–733 (2022)

Other AI Application in Cancer



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