

# Creating the tools for up-to-date oncology research in the African ancestry



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# Can knowledge and treatment of cancer inferred in European and Asian ancestries be directly transferred into the African ancestry?



**Cancer deaths in Africa raised by 27% since 2002 and incidence will double in the next 20 years**



GLOBAL HEALTH

## Cancer in sub-Saharan Africa

Knowledge of cancer in Africa brings needed diversity to improve health worldwide

## EXAMPLES OF CANCER DISPARITIES



### BREAST CANCER

African American women are nearly twice as likely as white women to be diagnosed with triple-negative breast cancer and are much more likely than white women to die from breast cancer.



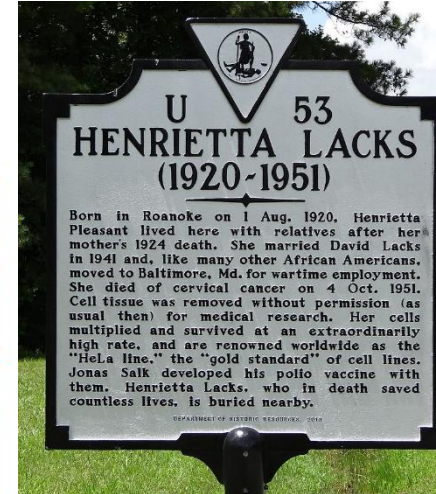
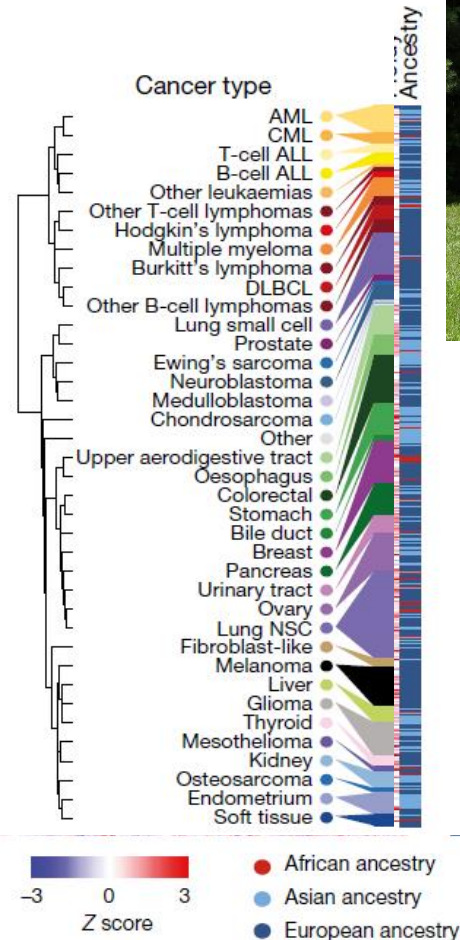
### PROSTATE CANCER

African American men are more than twice as likely as white men to die from prostate cancer.



### MULTIPLE MYELOMA

African Americans are twice as likely as whites to be diagnosed with and die from multiple myeloma.



HeLa cells - the first immortal human cells grown in culture. Isolated in 1951 from a cervical carcinoma derived from a 31-year-old African-American patient.

<https://doi.org/10.1038/s41586-019-1186-3>

## Next-generation characterization of the Cancer Cell Line Encyclopedia

Mahmoud Ghandi<sup>1,17</sup>, Franklin W. Huang<sup>1,2,13,17</sup>, Judit Jané-Valbuena<sup>1,2</sup>, Gregory V. Kryukov<sup>1</sup>, Christopher C. Lo<sup>1</sup>, E. Robert McDonald III<sup>2</sup>, Jordi Barretina<sup>1,16</sup>, Ellen T. Gelfand<sup>1</sup>, Craig M. Bielski<sup>1</sup>, Haoxin Li<sup>1,2</sup>, Kevin Hu<sup>1</sup>, Alexander Y. Andreev-Drakhlin<sup>1</sup>, Jaegil Kim<sup>1</sup>, Julian M. Hess<sup>1</sup>, Brian J. Haas<sup>1</sup>, François Aguet<sup>1</sup>, Barbara A. Weir<sup>1</sup>, Michael V. Rothberg<sup>1</sup>, Brenton R. Paolella<sup>1</sup>, Michael S. Lawrence<sup>1,4,5,6</sup>, Rehan Akbari<sup>7</sup>, Yiling Lu<sup>1</sup>, Hong L. Tiv<sup>1</sup>, Prafulla C. Gokhale<sup>8</sup>, Antoine de Weck<sup>3</sup>, Ali Amin Mansour<sup>1</sup>, Coyin Oh<sup>1</sup>, Juliann Shih<sup>1</sup>, Kevin Hadi<sup>10,11</sup>, Yanay Rosen<sup>1</sup>, Jonathan Bistline<sup>1</sup>, Kavitha Venkatesan<sup>3</sup>, Anupama Reddy<sup>3</sup>, Dmitriy Sonkin<sup>3,14</sup>, Manway Liu<sup>3</sup>, Joseph Lehar<sup>3</sup>, Joshua M. Korn<sup>3</sup>, Dale A. Porter<sup>3</sup>, Michael D. Jones<sup>3</sup>, Javad Golji<sup>3</sup>, Giordano Caponigro<sup>3</sup>, Jordan E. Taylor<sup>3</sup>, Caitlin M. Dunning<sup>3</sup>, Amanda L. Creech<sup>1</sup>, Allison C. Warren<sup>1</sup>, James M. McFarland<sup>1</sup>, Mahdi Zamanighomi<sup>1</sup>, Audrey Kauffmann<sup>9</sup>, Nicolas Stransky<sup>1</sup>, Marcin Imielski<sup>10,11</sup>, Yosef E. Maruvka<sup>1,4</sup>, Andrew D. Cherniack<sup>1,2</sup>, Aviad Tsherniak<sup>1</sup>, Francisca Vazquez<sup>1</sup>, Jacob D. Jaffe<sup>1</sup>, Andrew A. Lane<sup>2</sup>, David M. Weinstock<sup>2</sup>, Cory M. Johannessen<sup>1</sup>, Michael P. Morrissey<sup>3</sup>, Frank Stegmeier<sup>3</sup>, Robert Schlegel<sup>3</sup>, William C. Hahn<sup>1,2</sup>, Gad Getz<sup>1,4,5,6</sup>, Gordon B. Mills<sup>1</sup>, Jesse S. Boehm<sup>1</sup>, Todd R. Golub<sup>1,2,12</sup>, Levi A. Garraway<sup>1,2,18</sup> & William R. Sellers<sup>1,15,18\*</sup>

N=1393 – only 85 African (6%) of which 73 African-American 6 tissues only 1 SSA cell line; 10 only 2

Article  
**Shedding Light on the African Enigma: In Vitro Testing of *Homo sapiens-Helicobacter pylori* Coevolution**

Bruno Cavadas <sup>1,2,3,\*</sup>, Marina Leite <sup>1,2,4</sup>, Nicole Pedro <sup>1,2,3</sup>, Ana C. Magalhães <sup>1,2,3</sup>, Joana Melo <sup>1,2,3</sup>, Marcelo Correia <sup>1,2</sup>, Valdemar Máximo <sup>1,2,4</sup>, Rui Camacho <sup>5,6</sup>, Nuno A. Fonseca <sup>7</sup>, Ceu Figueiredo <sup>1,2,4</sup> and Luísa Pereira <sup>1,2,4</sup>

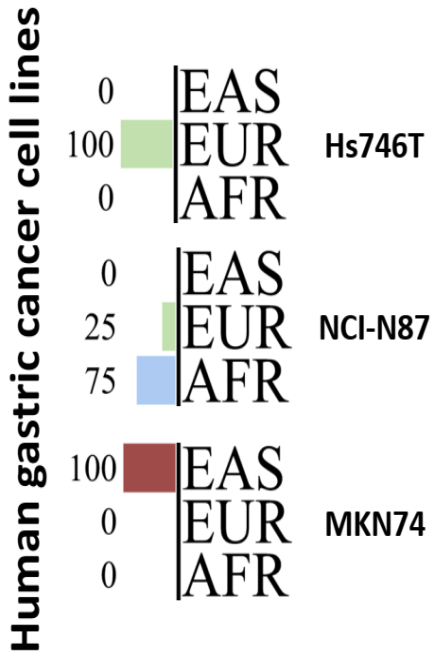
***Helicobacter pylori* strains**

*H. pylori* J99

*H. pylori* 26695

**African (*HpAFR*)**

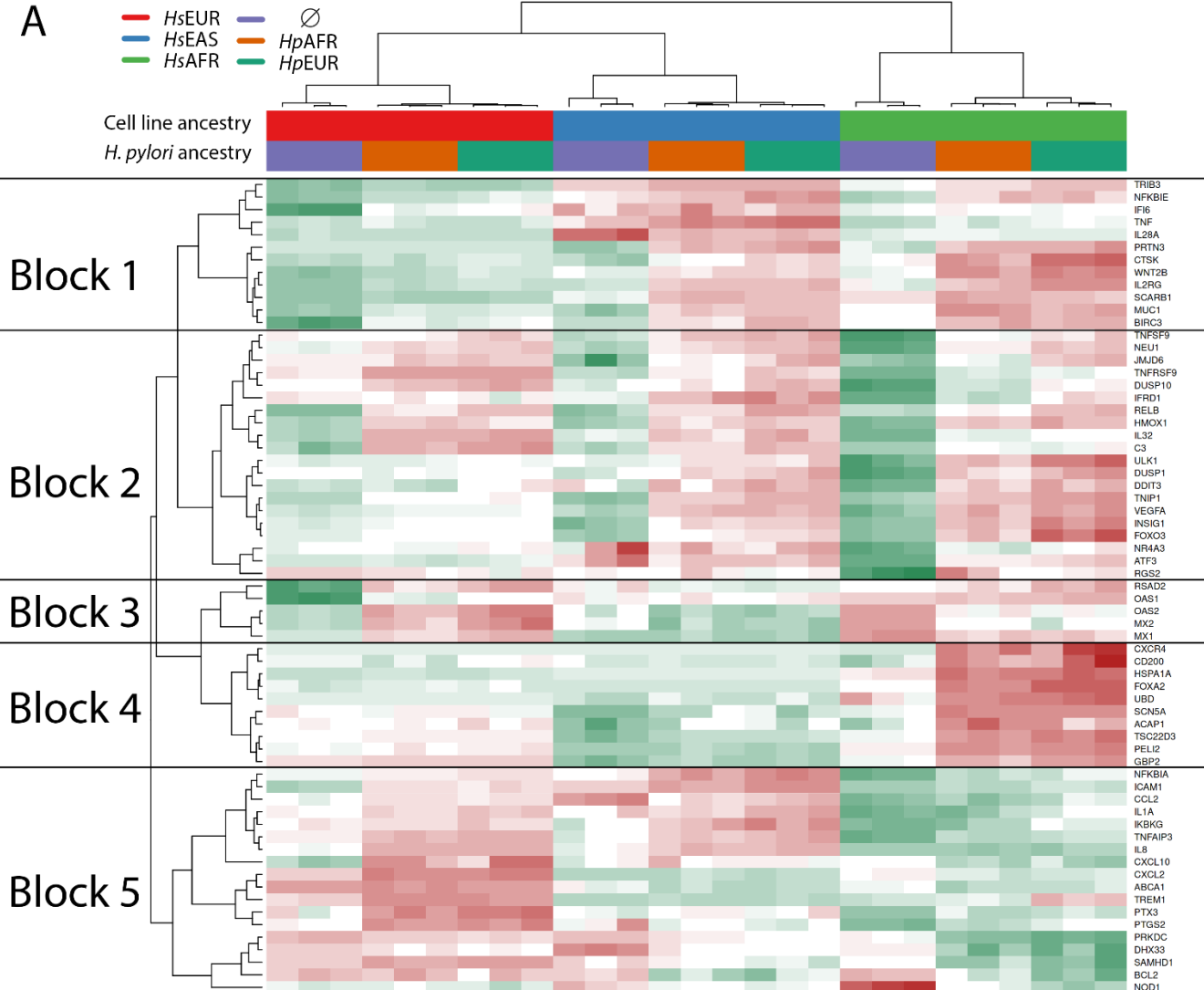
**European (*HpEUR*)**

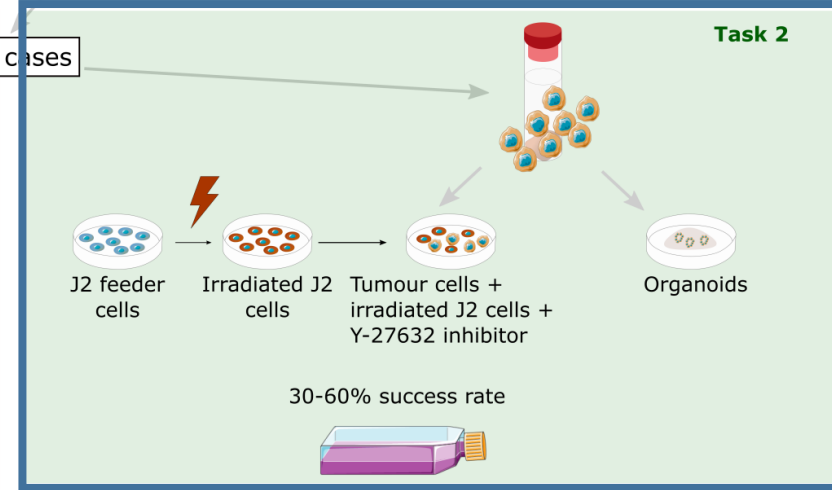
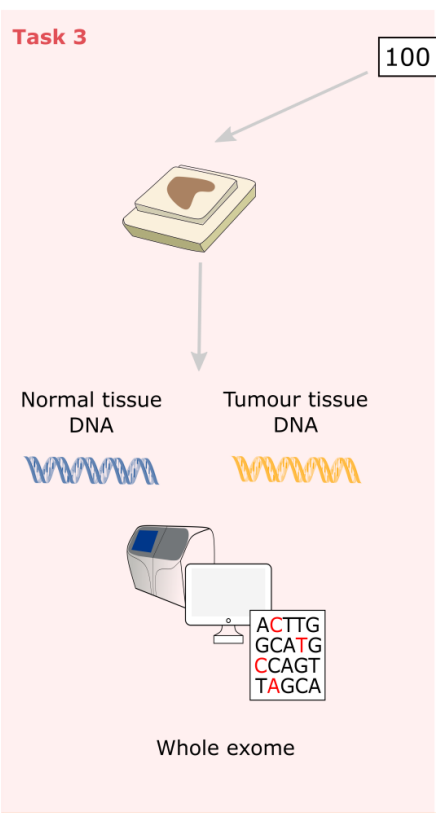
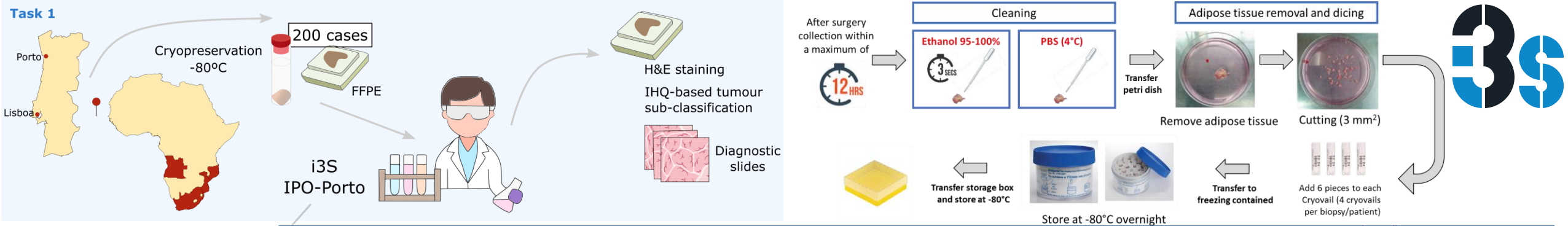


**European ancestry maladapted**

- . type-1 interferon signaling activated in Europeans (block 3)
- . pro-inflammatory not altered in African (block 5)

**Ion AmpliSeq™ Transcriptome**

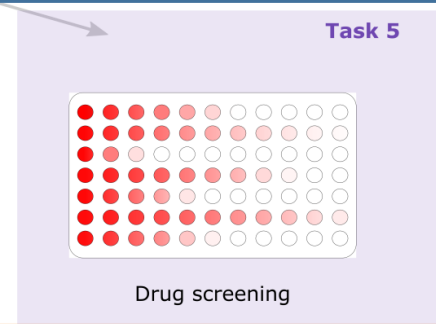
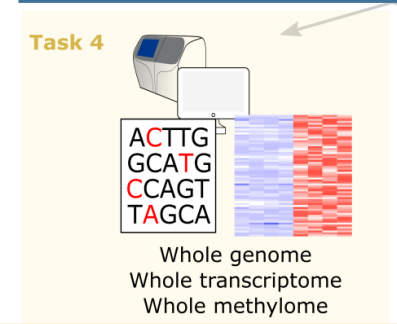




1- Conditional reprogramming with Rho kinase inhibitor (Y-27632) in combination with radiated fibroblast feeder cells

- . 30-60% success rate
- . rapid and efficient
- . phenotype and karyotype of original sample maintained (does not select subpopulations of cells)
- . worked for many normal and tumor epithelial cells

2- Organoid establishment



**Funded project (2022-2024)**

**Sub-Saharan cancer cell line panel:**

**from primary patient-derived cells to population tailored cancer treatment for the African ancestry**



Lúcio Lara Santos

Angola

Mozambique

Cape Verde

Dr. Fernando Miguel

Prof. Carla Carrilho

Dr. Hironcina Spencer

Head of the Angolan Institute of Cancer Control

Dr. Jotamo Come

Hospital Agostinho Neto, Praia

Clínica Sagrada Esperança, Luanda

Maputo Central Hospital



Ivo Julião – Malawi, “Médecins Sans Frontières”



Professor Paulo Costa; Dra Cláudia Pereira



Thank you



Bruno Cavadas  
Junior Researcher



Joana Barbosa Pereira  
Junior Researcher



Susana Seixas  
Junior Researcher



Patrícia Marques  
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Ricardo Pinto  
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Nuno  
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Pâmela Borges  
Visiting Scientists