International Doctoral School
Medical University of Lodz

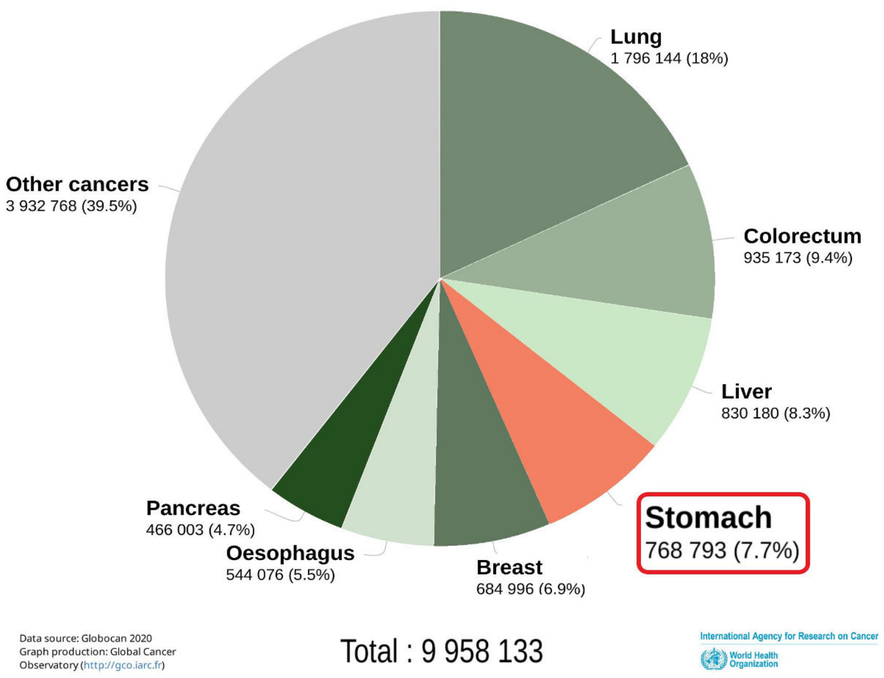
Assessment of changes in the expression profile of selected genes encoding epigenetic enzymes in blood cells as potential diagnostic and/or prognostic biomarkers of gastric cancer

Jagoda Jakubik, PhD student, Department of Biomedical Chemistry, Medical University of Lodz
Promoters Prof. UM, dr. hab. n. med. Katarzyna Lubecka-Gajewska, dr. inż. n. tech. Agnieszka Kaufman-Szymczyk

Introduction

Gastric cancer is one of the leading malignancies, ranking fifth in frequency of diagnosis and fourth cause of death from cancer worldwide. Each year, there is more than one milion new cases of gastric cancer. Although there is a decreasing trend in the global gastric cancer incidence rates, recent findings indicate an increasing trend of non-cardia gastric cancer among non–Hispanic whites aged <50 years. Gastric cancer is usually diagnosed at an advanced stage, so the mortality rates remain high. The poor prognosis is reflected in the 5-year survival rate, which in Poland is less than 25%. For the advanced stage of gastric cancer, median survival is less than 12 months. In patients with non-cardia adenocarcinoma, who were treated surgically, the 5-year survival rate decreases from 59% for stage 0-I tumors, to 18% for stage III-IV tumors. That underlines the importance of early gastric cancer detection.

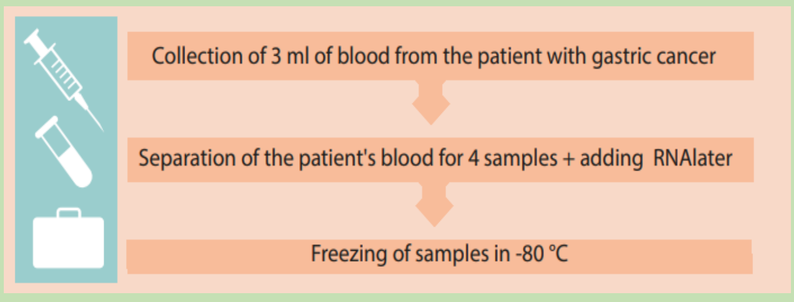
Figure 1.
Mortality from gastric cancer worldwide



Materials & Methods

Samples collection

1. The in vivo model includes human peripheral blood samples from the group of gastric cancer patients and from matched (gender, age, and ethnicity) healthy individuals as a novel approach of liquid biopsy.
2. The material for molecular tests are blood samples (3 ml) taken for K2EDTA, single-use tubes, from venous patients during diagnostic tests before surgery and from volunteers not suffering from malignant tumors
3. Blood samples are stored at -80 °C and then will be fully used for scheduled molecular testing.



The collection of the samples took place in the Department of Oncological Surgery, Department of Oncology, Medical University of Lodz.

Characteristics of patients

	Gender	Age	Neoadjuvant chemiotherapy	Tumor type
1	female	70	no	Adenocarcinoma
2	female	62	no	Adenocarcinoma
3	male	70	yes	Adenocarcinoma
4	male	72	no	Adenocarcinoma
5	male	66	no	Adenocarcinoma
6	male	66	no	Adenocarcinoma
7	female	70	no	GIST
8	female	83	no	GIST
9	female	73	no	Adenocarcinoma
10	female	48	yes	Adenocarcinoma
11	male	76	yes	Adenocarcinoma
12	female	79	no	Adenocarcinoma
13	male	70	no	Adenocarcinoma
14	male	73	no	Adenocarcinoma
15	male	62	no	Adenocarcinoma
16	female	63	yes	Adenocarcinoma
17	male	76	no	Adenocarcinoma
18	male	74	no	Adenocarcinoma
19	female	69	no	GIST
20	male	68	yes	Adenocarcinoma
21	male	71	yes	Adenocarcinoma
22	male	57	no	Adenocarcinoma
23	female	44	no	GIST
24	male	64	no	Adenocarcinoma
25	male	65	no	Adenocarcinoma
26	male	60	yes	Adenocarcinoma
27	female	78	no	Adenocarcinoma
28	male	55	yes	Adenocarcinoma
29	female	65	yes	Adenocarcinoma
30	female	56	no	Shwannoma
31	male	64	no	Adenocarcinoma
32	female	71	no	Adenocarcinoma
33	male	60	no	Adenocarcinoma
34	male	68	no	Adenocarcinoma
35	female	83	no	Adenocarcinoma
36	male	80	no	Adenocarcinoma
37	male	66	no	Adenocarcinoma
38	male	62	yes	Adenocarcinoma
39	female	75	no	Adenocarcinoma
40	female	67	no	GIST
41	male	82	no	Adenocarcinoma
42	male	75	no	Adenocarcinoma
43	male	69	no	Adenocarcinoma
44	female	50	yes	Adenocarcinoma
45	male	83	no	Adenocarcinoma
46	female	71	no	Adenocarcinoma
47	male	69	no	Adenocarcinoma
48	female	85	no	Adenocarcinoma
49	male	68	no	Adenocarcinoma
50	female	60	no	Adenocarcinoma
51	female	45	no	Adenocarcinoma
52	male	80	no	Neuroendocrine
53	male	87	no	Adenocarcinoma
54	male	71	no	Adenocarcinoma
55	female	62	no	Adenocarcinoma
56	female	63	no	Adenocarcinoma

Control group

Gender ratio (n=43)

Female	Male
51%	49%

Age ratio (n=43)

≤50	50-70	>70
9,3%	55,8%	34,9%

Figure 2.
Occurrence of H. pylori infection among patients with collected data at diagnosis or in the past (n=34)

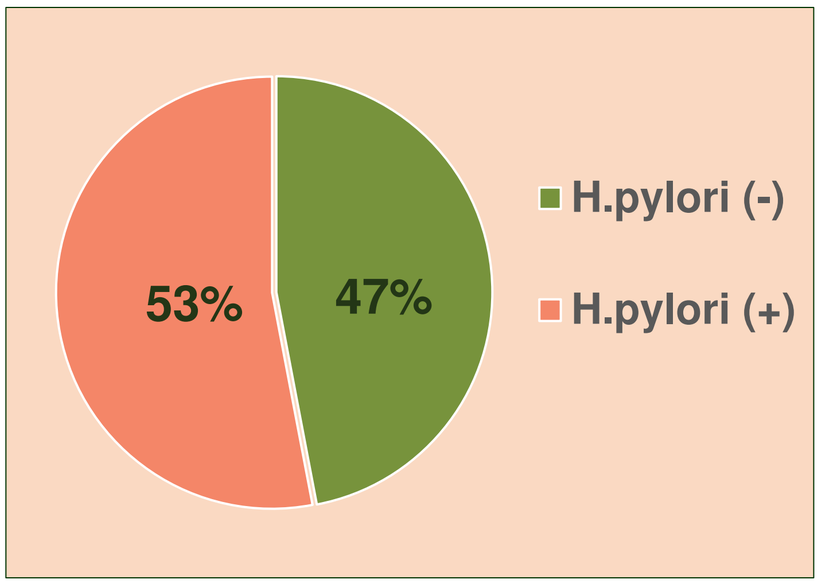
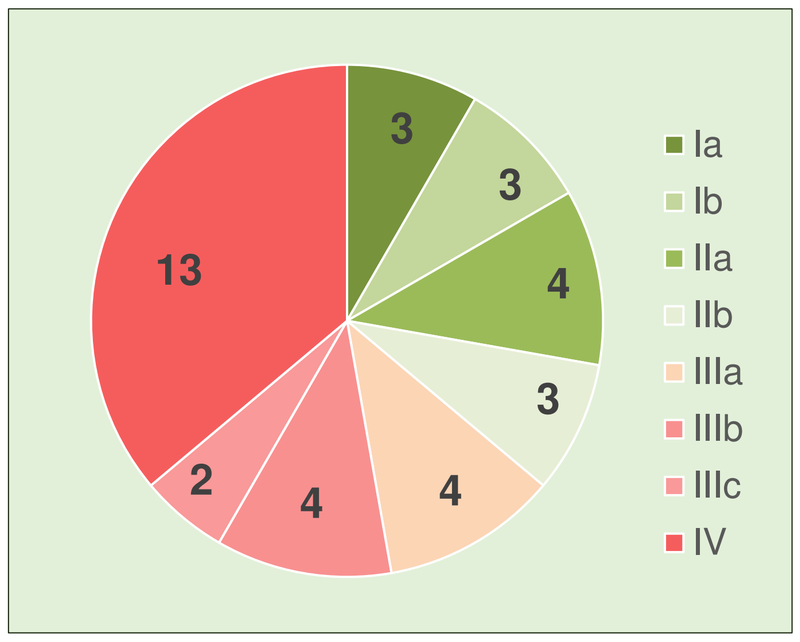
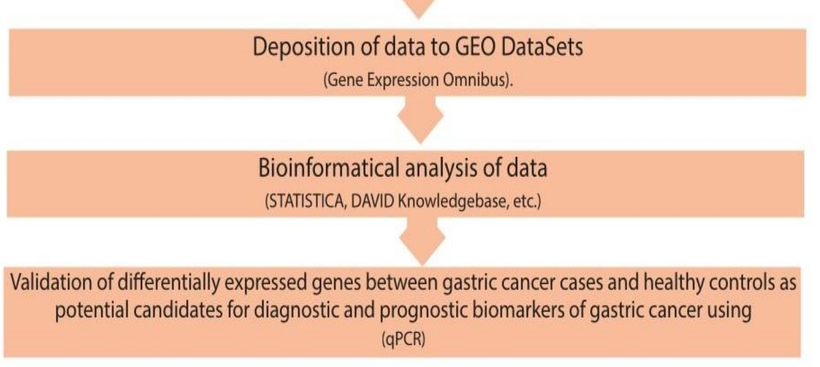


Figure 2.
Staging of patients with adenocarcinoma (n=36)



Molecular testing and analysis



- The blood samples, an easily accessible biological material, as well as a simple and fast test of gene expression (qPCR) analysis, used as an effective diagnostic tool, seem really promising and easily implemented in the clinic.
- Any identified candidates for molecular diagnostic and prognostic biomarkers of gastric cancer will be subjected to a patent application.

The decision of the Bioethics Committee of the Medical University of Lodz, received on May 11, 2021, No. RNN/133/21/KE