CD133 Protein Expression as a Biomarker for Early Detection of Gastric Cancer.

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Introduction of Gastric Cancers (GC)

- 4th most common cancer in incidence.

- Every year ≈ 1 million patients worldwide are diagnosed with GC. (1)

- 2nd malignant neoplasm of causing death worldwide. (2)


Lauren classification:
Pathology, epidemiology and prognosis

**Diffuse type:**

**Etiology:**
Arises in the context of a chronic inflammation (but bypassing the atrophic and intestinal metaplasia).

Less affected by HP and environmental factors.

Occurs in younger age with predilections for females.

**Prognosis:** Worse prognosis and shorter life time

**Intestinal type:**

**Etiology:**
Multiple steps (atrophy, intestinal metaplasia and dysplasia then cancer).

- H. pylori infection.
- Diet and environmental factors.

Occurs in elderly

**Prognosis:** Longer course and has better prognosis.

A Biomarker for Early Detection of Gastric Cancer is needed.

**Background:**

Most cases of GC are diagnosed at advanced stage and the 5-year survival rate is 29%.

However, detection at early stage can decrease the mortality rate (5-year survival rate is 80-90%)

Yet specific biomarkers for early detection remain elusive.
CD133 (prominin-1) is a 120-kDa penta-span membrane glycoproteins.

CD133 been considered as a cancer stem cell marker in many organs including stomach, colon, lung, brain, prostate, liver and pancreas.

Its appearance on the cell surface decreases rapidly as cell differentiates.

CD133 (prominin-1)

While the precise function of CD133 remains unknown.(5)

CD133 plays as a prognostic factors in stomach and other organs.

Its overexpression is associated with later TNM stage, lymph node metastasis, occurrences of lymphovascular invasion. (6)

5. Irollo E, Pirozzi G (2013). "CD133: to be or not to be, is this the real question?" Am J Transl Res. 5 (6): 563–81. PMC3786264 PMID 24093054

CD133 Protein Expression as a Biomarker for Early Detection of Gastric Cancer.

Background:

The present work proposes CD133 as a marker for disease progression in gastric cancer.

We hypothesize that CD133+ expression may increase during the progression from normal gastric mucosa to metaplasia, dysplasia and carcinoma.
Material and methods:

Gastric samples were taken from 111 H. pylori positive patients from Cali, Colombia.

The samples were taken from normal gastric mucosa (NM=21), gastritis/metaplasia (IM=26), gastric dysplasia (DS=19) and invasive gastric adenocarcinoma (GCA=45).
Material and methods:

All cases were stained for CD133 using the Ventana automated immunostainer Discovery XT (Ventana, Tucson, AZ).

At each of the disease progression stages we measured variations in IHC CD133 expression using the Allred scoring system featuring a proportion score and an intensity score to give a total score between 0 and 8.

A Proportion Score (PS)

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<tr>
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<tr>
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B Intensity Score (IS)

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Allred Score = PS + IS (range 0-8)
Dysplasia

Adenocarcinoma
**Results:**

A significant increase in CD133 expression observed during all three stages of progression; from normal to intestinal metaplasia the total positivity score increased by 54% (P value: 0.001); from intestinal metaplasia to dysplasia the increase was 38% (P value: 2.2E07) and from dysplasia to GCA it was 15% (P value: 1.8E09).
Conclusion:

We report modifications in CD133 expression during the progression of gastric neoplasia from normal to metaplasia, dysplasia and carcinoma.

CD133 (prominin-1) expression may represent a new therapeutic target in gastric carcinogenesis.

Additional studies are required to test the role of CD133 as new biomarker for early detection of gastric cancer.
Thank you all!

Special Thanks to Drs. Coppola and Dr. Lauwers