

CANCER STEM CELLS

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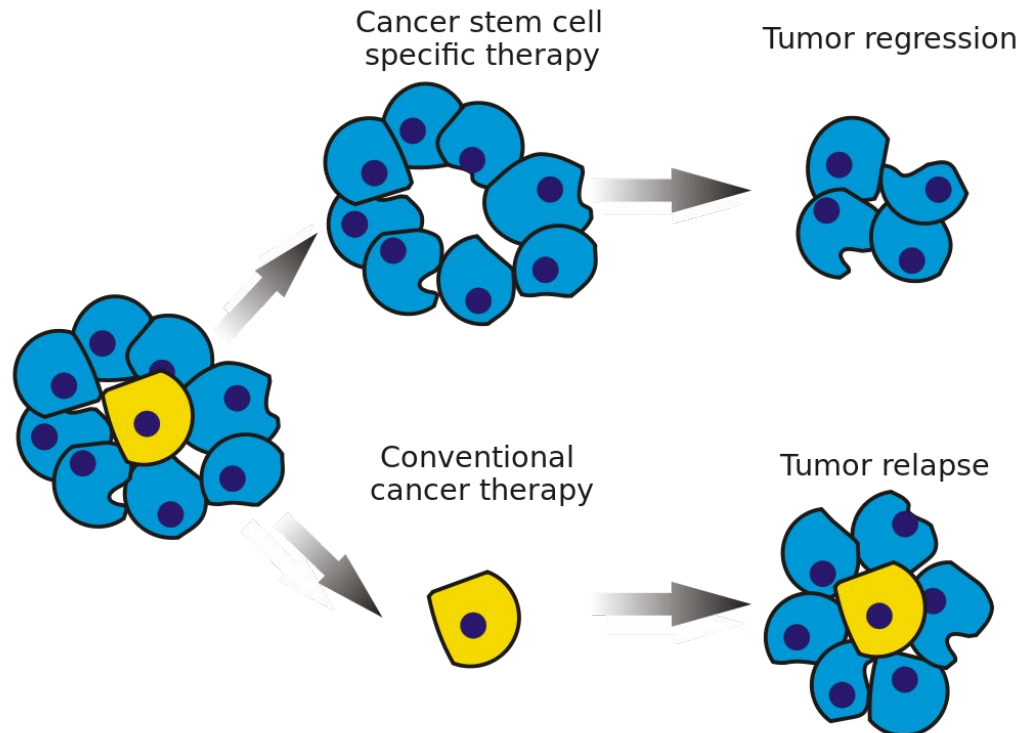
Dr. Forrest Kievit

Glioblastoma Brain Cancer

- Highly malignant
 - Median survival for adults treated with radiation therapy is about 14.6 months
 - Fewer than 3% of patients are still alive 5 years after diagnosis
- Thought to be on account of presence of cancer stem cells (CSCs)

Background and Context

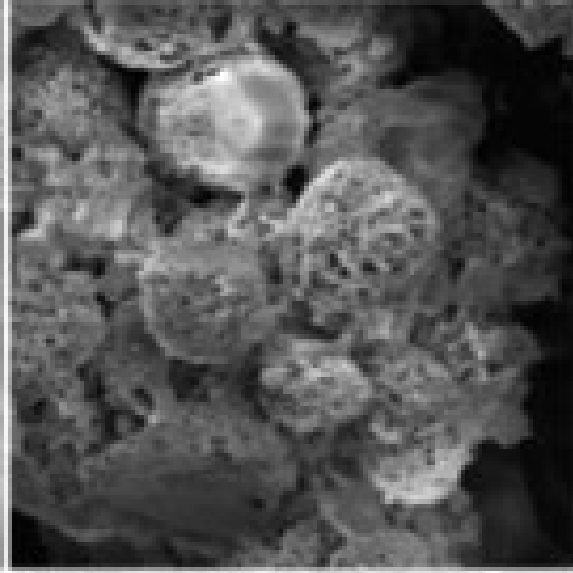
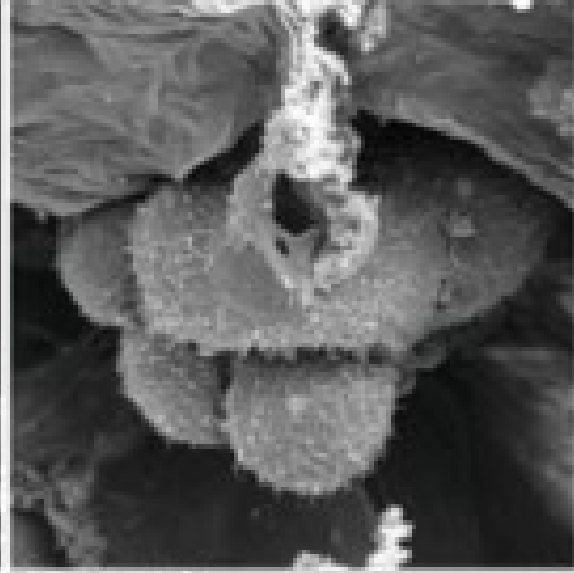
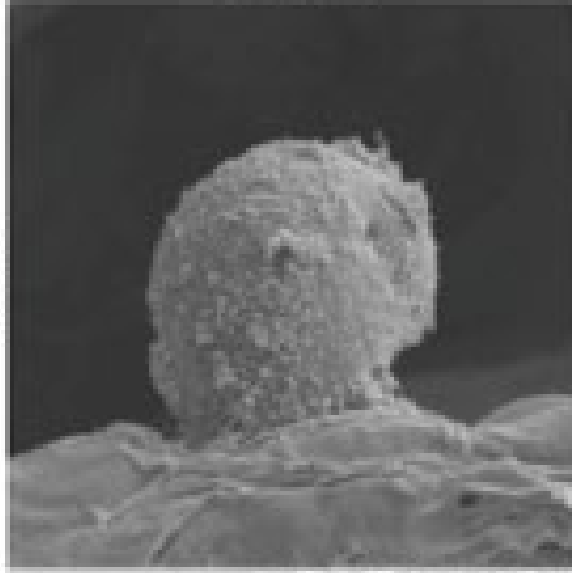
- Cancer stem cells in glioblastoma brain tumors
 - Heterogeneous mixture of stem cells and differentiated tumor cells
- Current therapies and their effectiveness
 - CSCs vs. differentiated cells



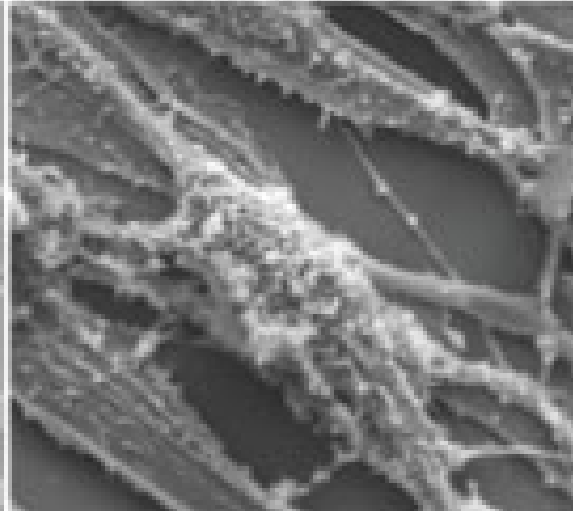
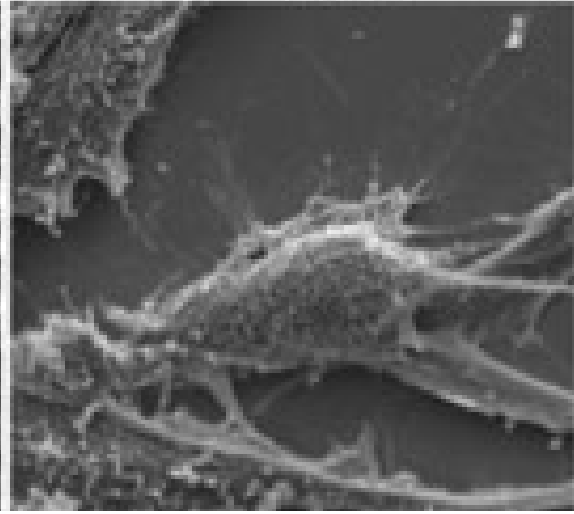
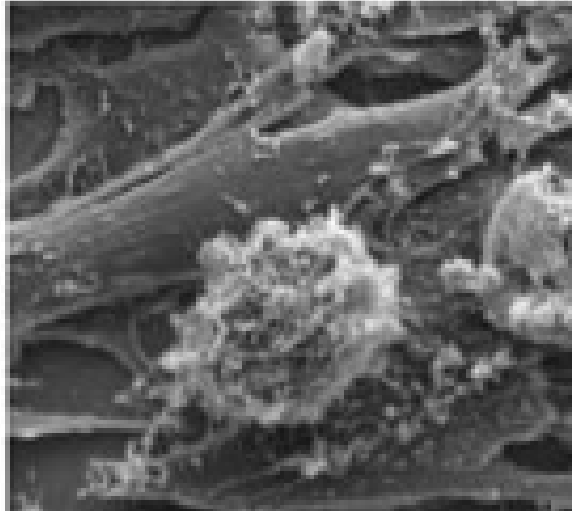
3D scaffolds

- How can researchers create a sustainable and developable model to study CSCs?
- 3D scaffold vs. in vitro
 - Effectiveness in animal testing—in vitro implantations have been unsuccessful where as cells cultured in 3D scaffolds have had more success
 - Both chemical properties of scaffold and 3D nature more accurately simulate the growth environment of CSCs in animals
- Biodegradable, easily manufactured

CA



2D

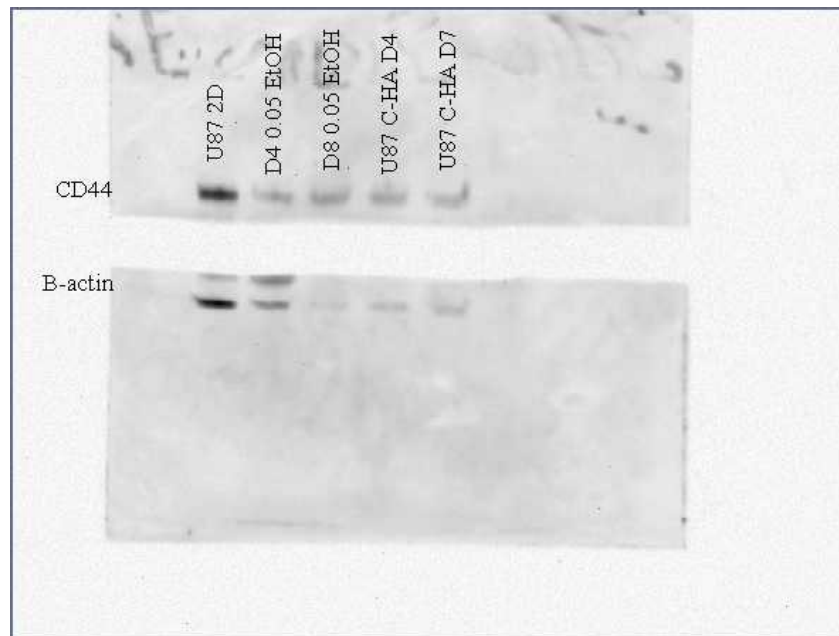
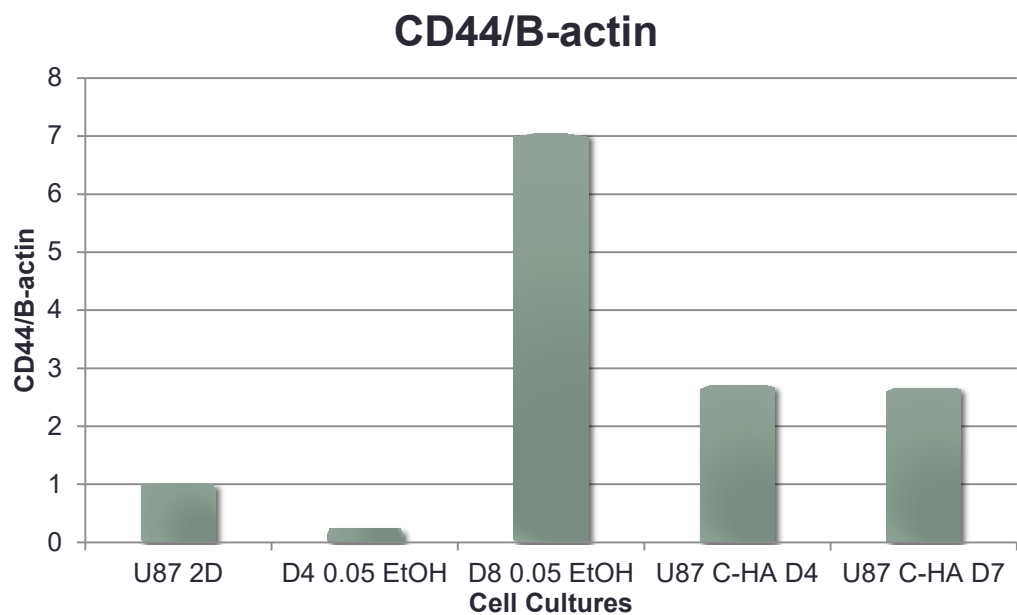
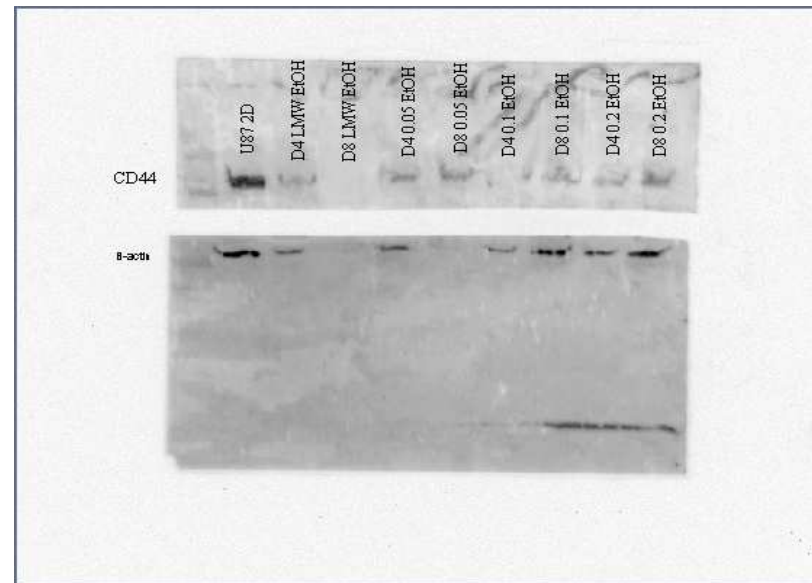
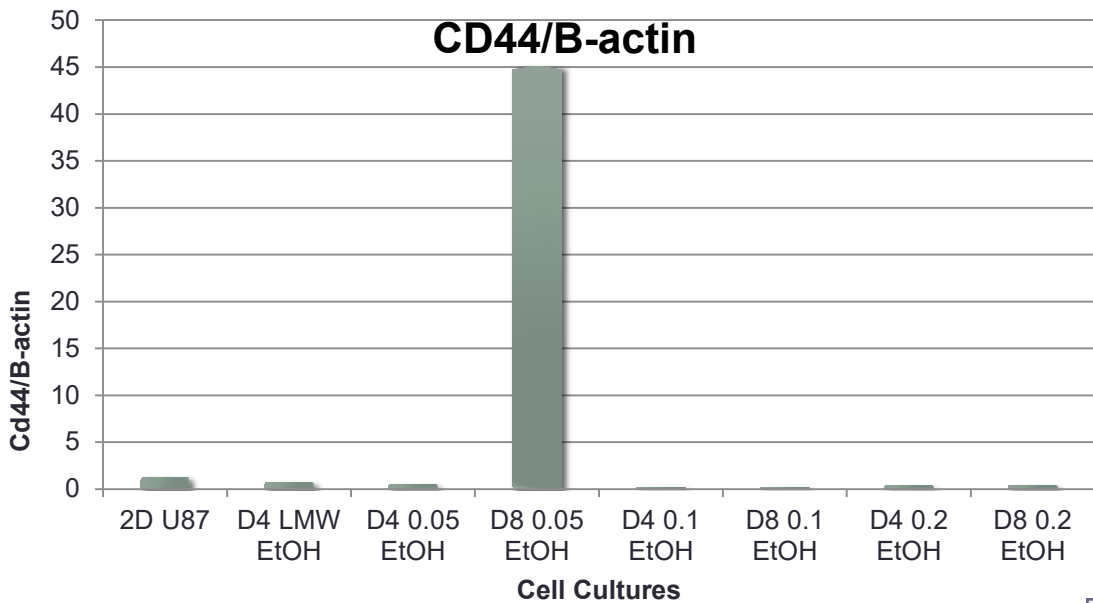




My Purpose

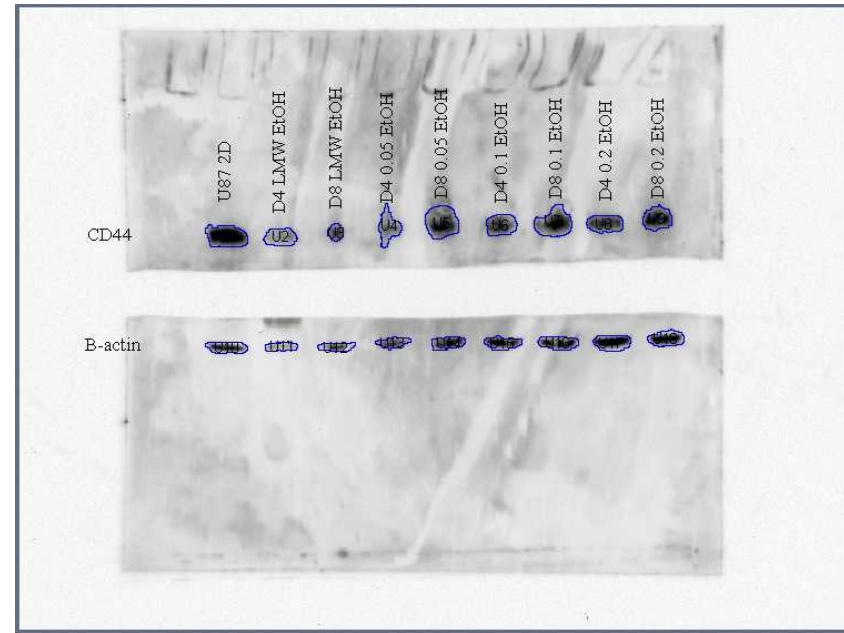
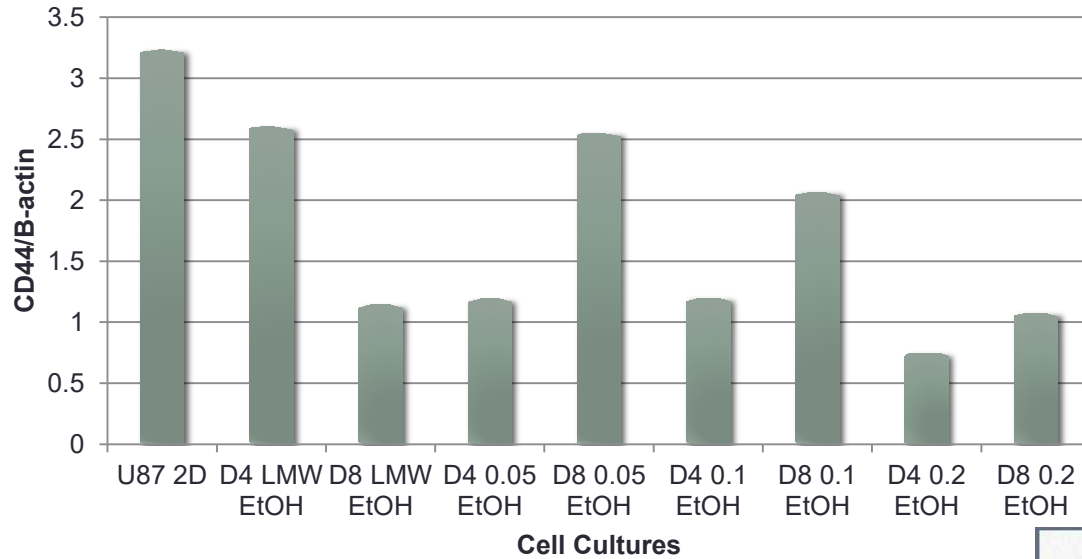
- Different types of scaffolds—C-HA, CA (chitosan alginate)
 - Which ones are most effective and consistent in creating CSCs to be researched?
- Testing using various protein indicators of CSCs through Western blot technique

Results—CD44



Results—CD44 (continued)

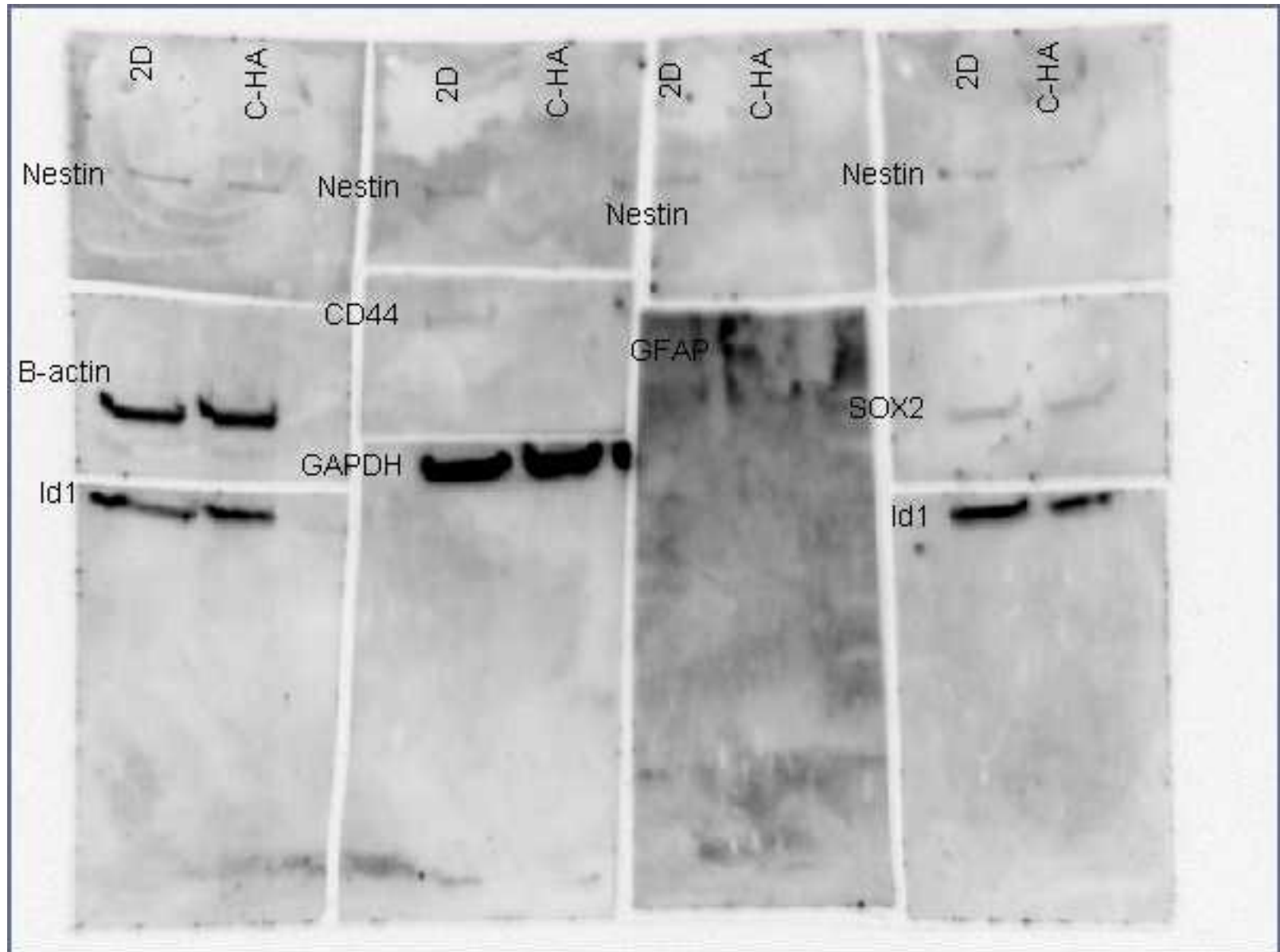
CD44/B-actin 7/10/14



C-HA and 2D scaffolds

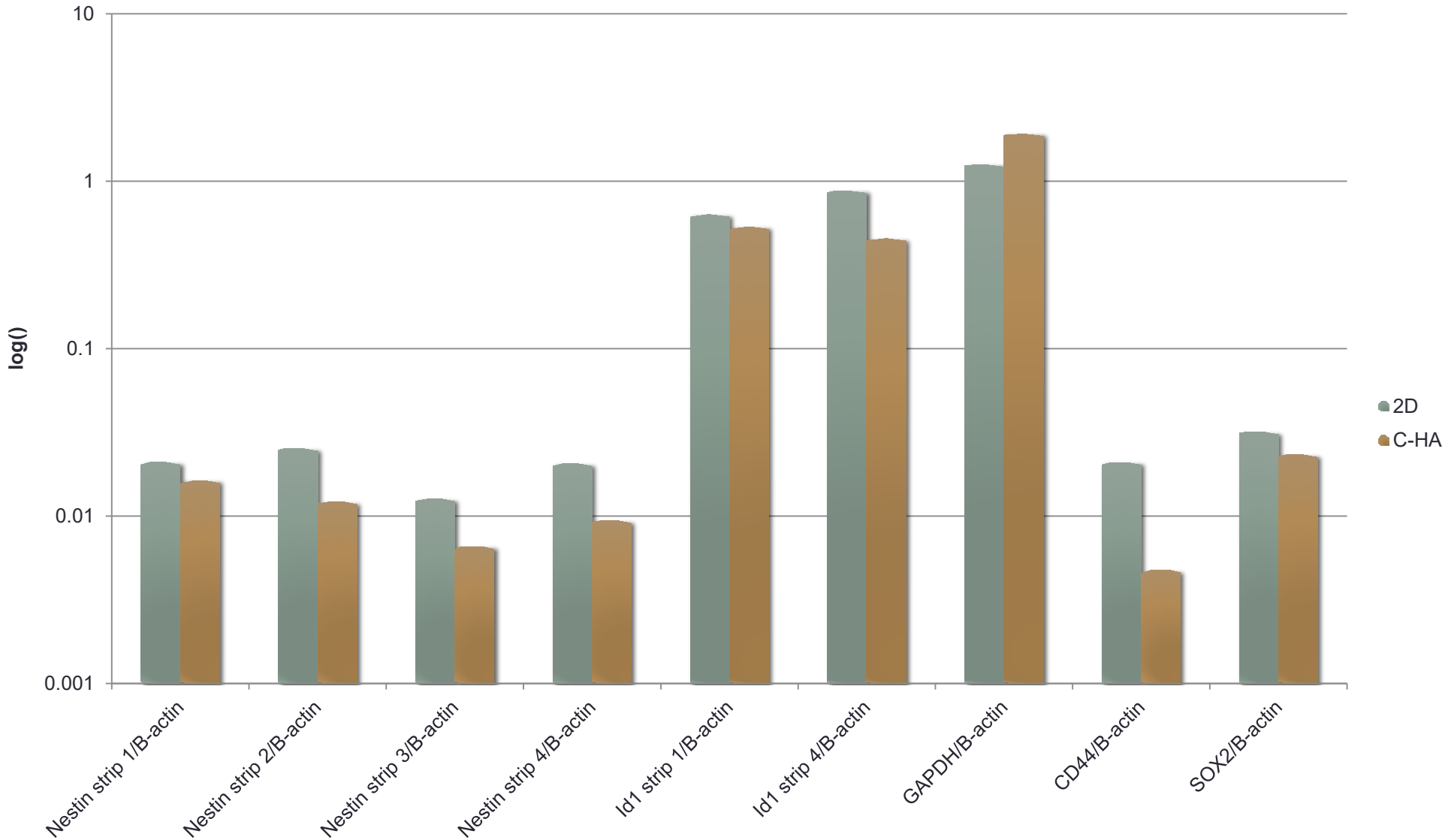
- Protein indicators used:
 - Nestin and GFAP
 - Id1
 - CD44
 - SOX2
 - GAPDH (control)
 - B-actin (control)

C-HA and 2D scaffold results (cont.)



C-HA and 2D scaffold results

2D scaffold vs. C-HA for CSC indicators



Conclusions

- C-HA vs. CA scaffold
 - Consistency of results of C-HA scaffold
- 3D scaffolds as models
- Where do we go from here?
 - Once the 3D scaffold can be perfected, other researchers around the world can easily receive the scaffolds and begin to grow their own tumors to study CSCs such that a new and more advanced therapy can be formulated to better attack glioblastoma brain cancer.