



Marketing and Design Intern

Jun 2019 - Jun 2021

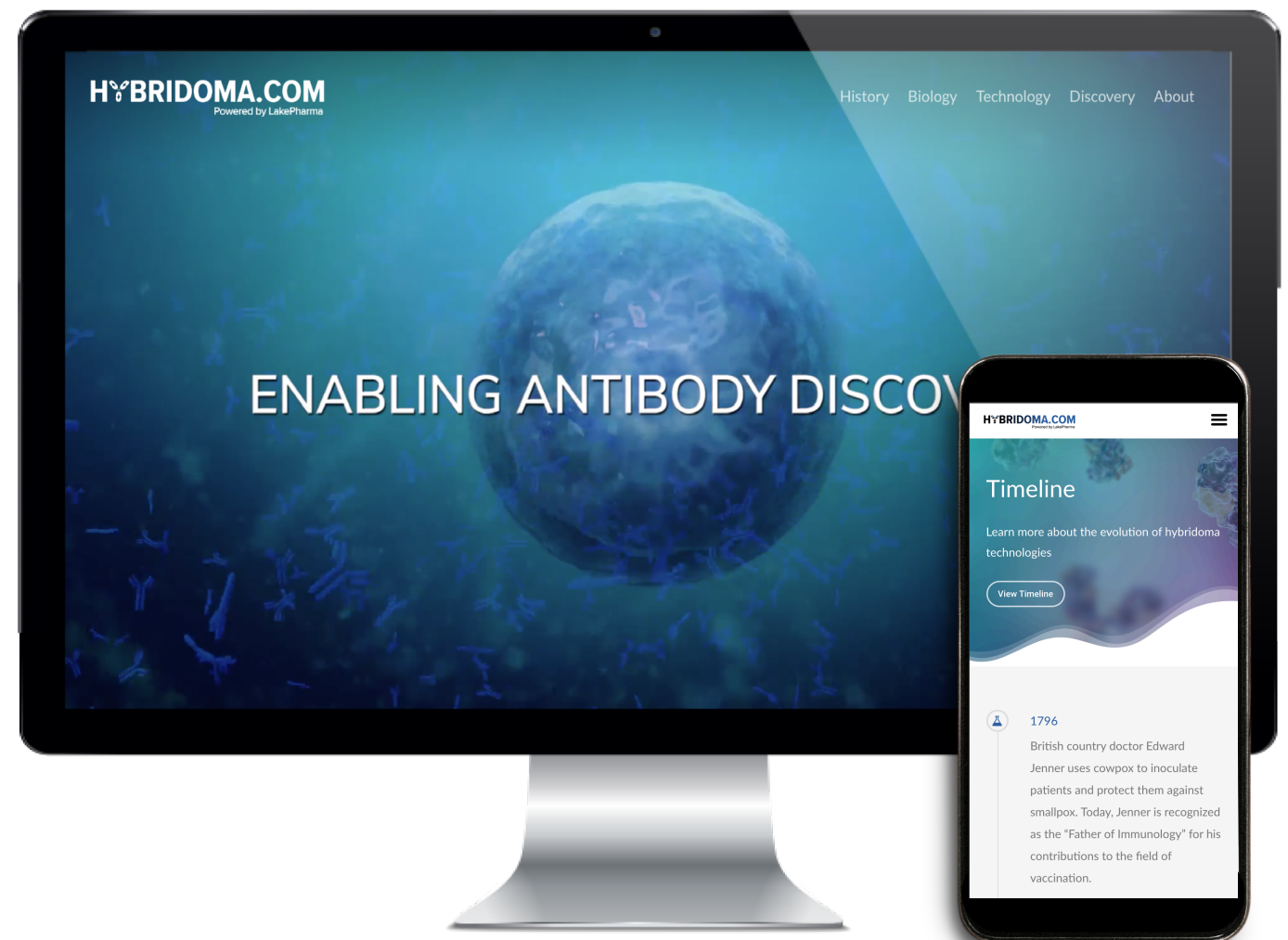
# LakePharma, a B2B pharmaceutical company.

Goal: Promote and educate potential clients on LakePharma's hybridoma services with a new website brand for hybridoma.com.

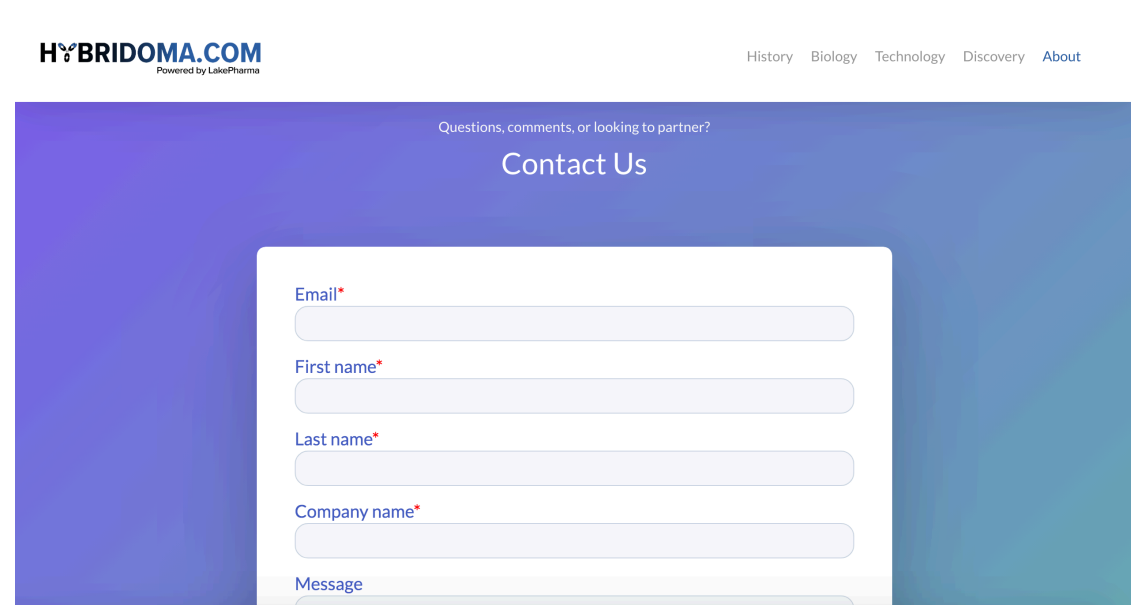
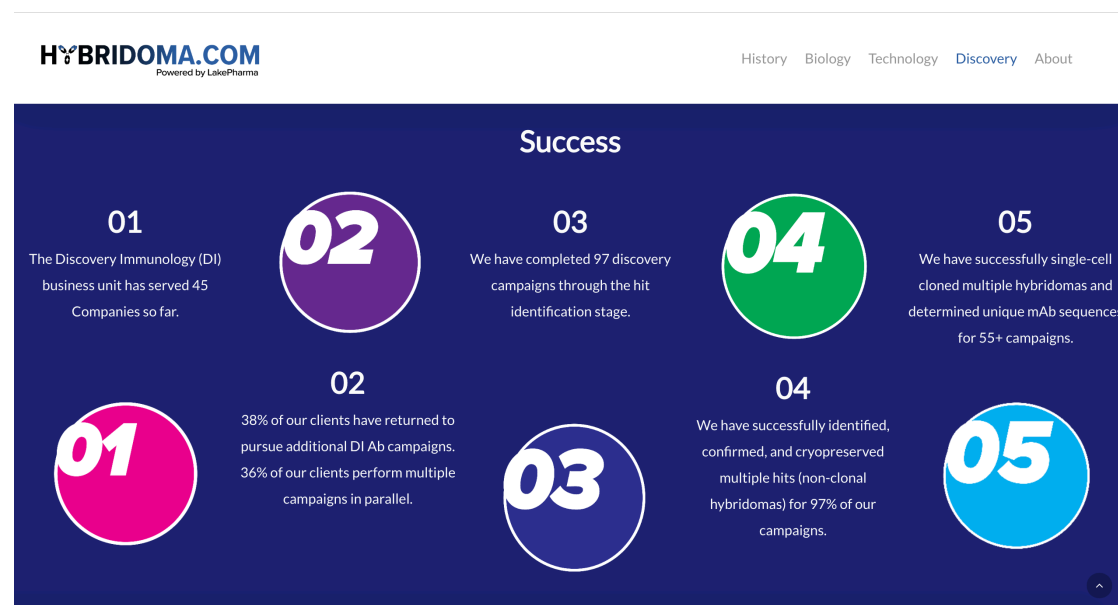
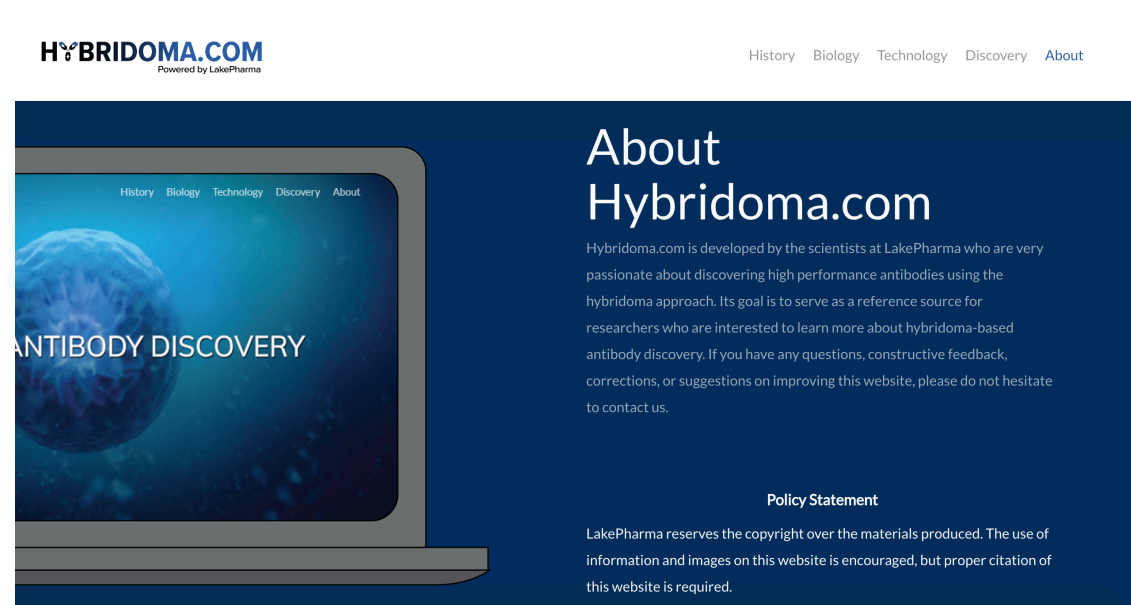
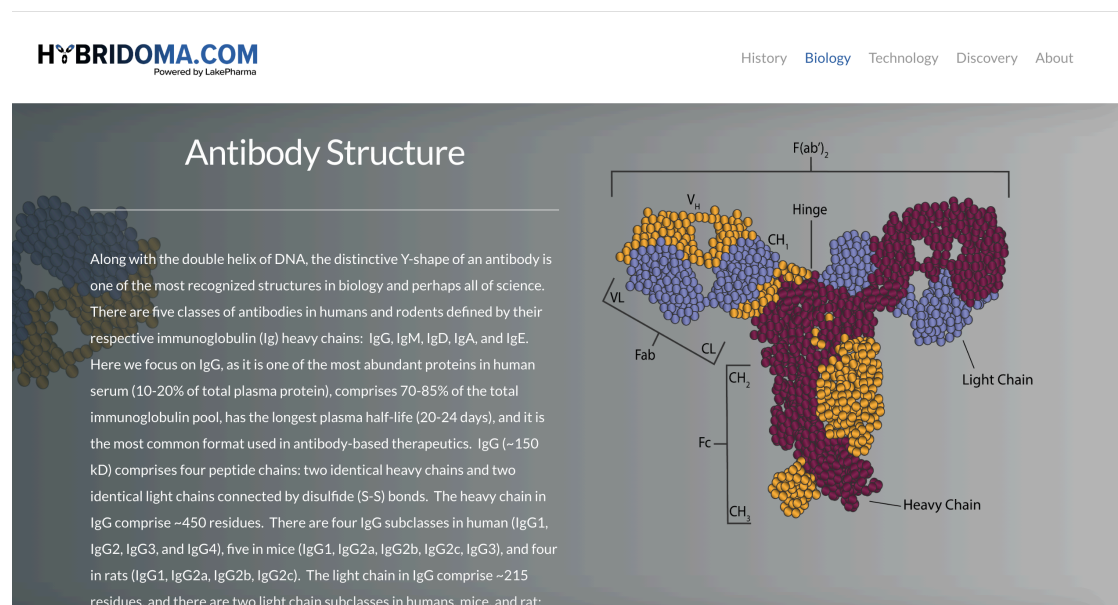
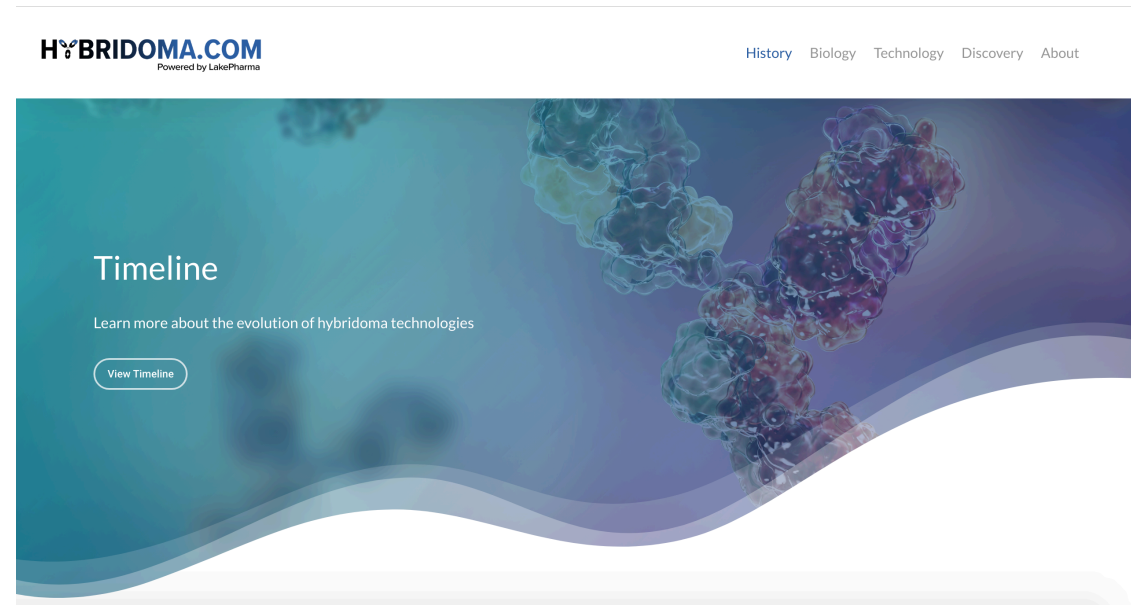
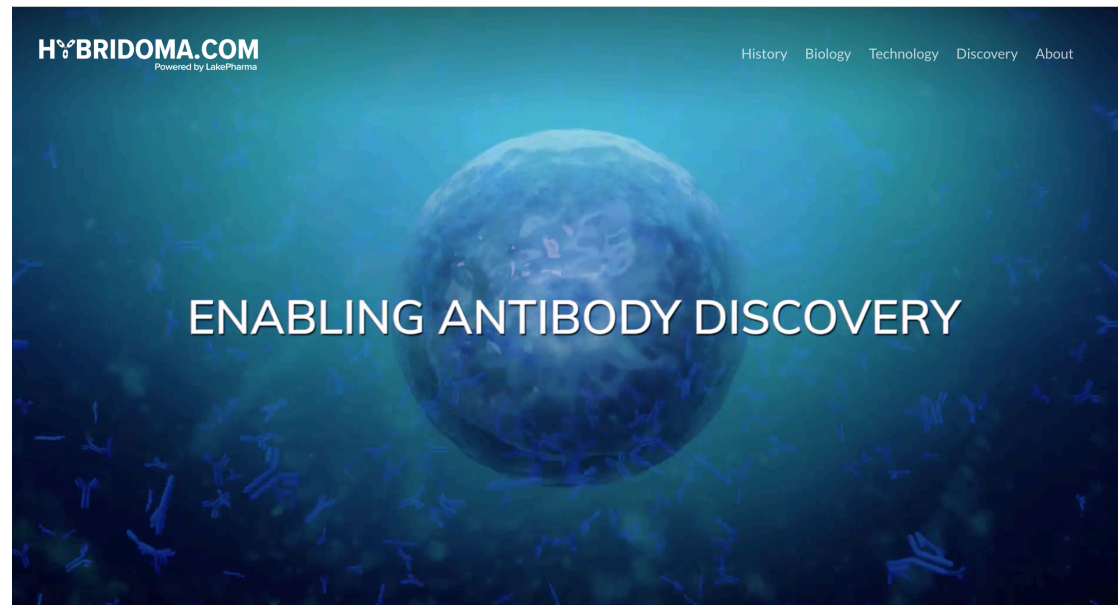
## Responsibilities:

### PM, Design, Developer

- Managed project timeline and priorities using a gantt chart
- Created designs, illustrations, and graphics using Adobe Illustrator and Photoshop, and homepage animation using Adobe Premiere and After Effects
- Solo developer of hybridoma.com, using Wordpress, HTML, and CSS for desktop and mobile





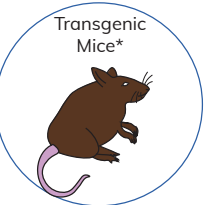


# Graphics

## Infographics

### Rodent Considerations for Hybridoma-Based Antibody Discovery

Selecting the right host is critical when discovering novel antibodies using the hybridoma approach. Below is a quick comparison of commonly used rodents in antibody discovery campaigns.



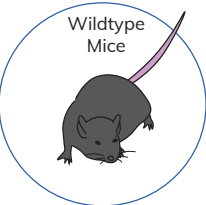
#### Transgenic Mice\*

##### Advantages

- Fully human variable regions (VH and VL domains)
- Reduced antigenicity preserves in vivo efficacy
- Improved developability (humanization not required/in vitro affinity maturation often not required)

##### Considerations

- Increased cost when compared with WT mice
- Licensing terms required
- Immune response can take longer to develop compared to WT mice
- If human/ mouse targets have high identity, or if mouse cross-reactivity is required, tolerance-breaking approaches likely needed



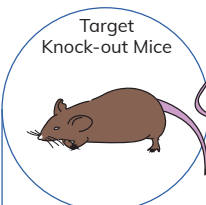
#### Wildtype Mice

##### Advantages

- Low cost: no terms, royalties, or milestones
- Proven, tried-and-true platform: most FDA-approved mAbs were discovered using WT mice

##### Considerations

- If human/mouse targets have high identity, or if mouse cross-reactivity is required, tolerance-breaking approaches likely needed
- For therapeutics applications, Ab reformatting and/or humanization might be required



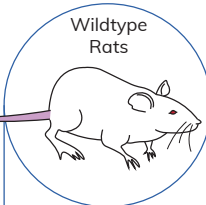
#### Target Knock-out Mice

##### Advantages

- A preferred option if mouse/human share high identity, or if mouse cross-reactivity is required

##### Considerations

- For therapeutics applications, Ab reformatting and/or humanization might be required
- Depending on the function of the target gene, KO mice may have impaired adaptive immune responses, hindering in vivo Ab generation



#### Wildtype Rats

##### Advantages


- Low cost: no terms, royalties, or milestones
- A preferred option if mouse cross-reactivity is required
- Rat B cells are compatible fusion partners with LakePharma's myeloma cell line

##### Considerations

- For therapeutics applications, Ab reformatting and/or humanization might be required
- Rat immunizations require 4x as much antigen per animal as mouse immunizations.

To learn more about hybridoma-based antibody discovery services, please visit: [lakepharma.com/hybridomas](https://lakepharma.com/hybridomas)

## Flyer Layouts



### Single Domain Antibody Libraries

LakePharma has partnered with Twist Biopharma, a division of Twist Bioscience, to offer single domain antibody libraries as part of the antibody discovery and engineering services.

#### Three Single Domain Antibody Libraries

##### VHH Ratio

Specific oligo pools model the natural VHH repertoire

##### VHH Shuffle


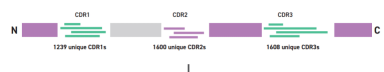
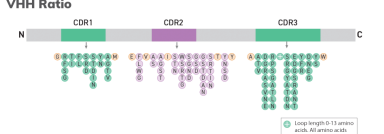
Natural llama CDR sequences in the context of a llama consensus framework

##### VHH hShuffle

Natural llama CDR sequences in the context of a partially humanized VHH framework

#### Highlights

- Small & modular antibodies
- Stable & robust
- Easier to engineer & manufacture
- Access to epitopes that are usually sterically hindered by an IgG
- Create building blocks for bispecific antibodies
- Off-the-shelf libraries ready for screening

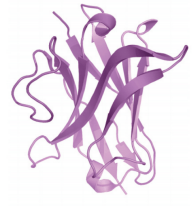


#### VHH Shuffle

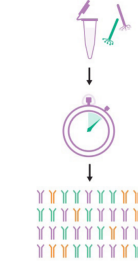
- Each unique CDR individually synthesized
- Shuffled in consensus llama framework
- Final diversity of library greater than theoretical diversity
- Theoretical library diversity of  $3.2 \times 10^9$

#### VHH hShuffle

- Shuffled CDRs with theoretical library diversity of  $3.2 \times 10^9$
- Partially humanized framework: Framework 1, 3 and 4 were humanized using the human germline DP-47 framework



### Proof of Concept Data



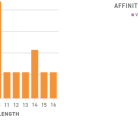
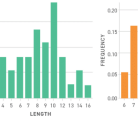
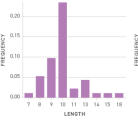
- Panning & Screening - VHH Ratio - VHH Shuffle - VHH hShuffle
- Sequencing
- Reformatting to IgG and DNA scale-up
- Affinity Determination and Developability

- 5 successive rounds against protein target
- Phage ELISA screen
- NGS clonal enrichment monitored at each round
- All unique ELISA-positive clones synthesized as VHH-Fc
- VHH-Fc affinities determined using Carterra® LSA platform
- VHH-Fc developability assessed using a panel of assays

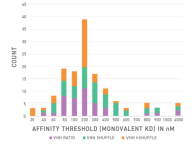
### ELISA + Colony Count: 1 x 384-Well Plate Picked per Library per Round

Library	Round 3	Round 4	Round 5	Uniques
VHH Ratio	58	85	188	47
VHH Shuffle	128	211	287	58
VHH hShuffle	82	222	255	56

### CDRH3 Length Distributions



### Array SPR Binding Analysis



TIGIT AFFINITY DISTRIBUTION - VHH LIBRARIES

AFFINITY THRESHOLD (MONOVALENT KD) IN nM

Anti-TIGIT clones from VHH libraries encompass a range of affinities and diversity

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## Email Signatures

### Save the Date - October 10, 2019

## LakePharma Symposium on Next-Generation Therapeutics

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## Icons