Storyboarding for Publications

Bryan A. Ballif
Associate Professor
Department of Biology
The University of Vermont
Stories begin with a beginning…

What is the justification/reason for uncovering and telling the story?
Science Stories Have Typically Two-Part Beginnings

Part 1: Statement of Limitation or Mystery Regarding A Protein/Gene/Disease (protagonist)---suggesting a need to discover,…

Part 2: Following Sufficient Background a Hypothesis or Prediction or Initial Experiment is Presented (the adventure begins).
Common Beginnings to Part 1 of Science Stories

Protein/Gene X is essential for Process Y… “but the molecular mechanisms are poorly understood…”

Disease A is more common among group of people B, “but no satisfactory explanation exists…”
Sighed Mayzie, a lazy bird hatching an egg:
“I’m tired and I’m bored
And I’ve kinks in my leg
From sitting, just sitting here day after day.
It’s work! How I hate it!
I’d much rather play!
I’d take a vacation, fly off for a rest
If I could find someone to stay on my nest!
If I could find someone, I’d fly away—free...”

Then Horton, the Elephant, passed by her tree.
“Hello!” called the lazy bird, smiling her best,
“You’ve nothing to do and I do need a rest.
Would YOU like to sit on the egg in my nest?”
Question: Can an Elephant Hatch an Egg?

The elephant laughed.
"Why, of all silly things!
I haven't feathers and I haven't wings.
Me on your egg? Why, that doesn't make sense. . . .
Your egg is so small, ma'am, and I'm so immense!"
"Tut, tut," answered Mayzie. "I know you're not small
But I'm sure you can do it. No trouble at all.
Just sit on it softly. You're gentle and kind.
Come, be a good fellow. I know you won't mind."
"I can't," said the elephant.
"PL-E-E-ASE!" begged the bird.
"I won't be gone long, sir. I give you my word.
I'll hurry right back. Why, I'll never be missed. . . ."

"Very well," said the elephant, "since you insist. . . .
You want a vacation. Go fly off and take it.
I'll sit on your egg and I'll try not to break it.
I'll stay and be faithful. I mean what I say."
"Toodle-oo!" sang out Mayzie and fluttered away.
Methods/Data Collection Part II
The Unexpected Leads to Methods/Data Collection Part III
...And they sent him home
Happy,
One hundred per cent!
What Killed Off the Giant “Elephant Bird” of Madagascar?
Protein/Gene [Dab1 and Dab1 tyrosine phosphorylation] are essential for Process Y [mammalian brain development] “but the molecular mechanisms are poorly understood…”

We Hypothesis Dab1 tyrosine phosphorylation leads to the binding of embryonic brain proteins involved in a Reelin-Regulated Signaling Pathway (the adventure begins).
A large section of what we know about corticogenesis began with the finding of a spontaneous mouse mutant (1948 in Edinburgh) called the Reeler mouse.
Deficiencies in Reelin/Dab1 Signaling are Manifest in the Laminated Tissues of the Brain
Emerging Reelin Signaling -- 2001

Reelin

VLDLR, ApoER2

Dab1

SFK

Migratory Cues

Reelin
Reelin Induces Dab1 Tyrosine Phosphorylation in Cultured Forebrain Neurons
Emerging Reelin Signaling -- 2001

Reelin

VLDDL, ApoER2

Dab1

Src

X

Migratory Cues
Activation of a Dab1/CrkL/C3G/Rap1 Pathway in Reelin-Stimulated Neurons

Bryan A. Baliff, Lionel Arnaud, William T. Arthur, Deborah Guris, Akira Imamoto, and Jonathan A. Cooper

Current Biology, Vol. 14, 606–610, April 6, 2004
Figure 1. Purification of Murine Embryonic Brain Proteins Interacting Specifically with Phosphotyrosyl-Dab1

A

Embryonic brain extract

Glutathione Sepharose

his\textsubscript{6}-GST

his\textsubscript{6}-Dab\textsubscript{1}\textsuperscript{1-252,4F}

his\textsubscript{6}-Dab\textsubscript{1}\textsuperscript{1-252,WT}

MgCl\textsubscript{2} elution

B

\begin{align*}
&\text{a} & \text{b} & \text{c} & \text{d} \\
&\text{pTyr} & \text{(pDab1)} & \text{Dab1} \\
&\text{64} & \text{64} & \text{1} & \text{2} & \text{3} & \text{4}
\end{align*}
Figure 1. Purification of Murine Embryonic Brain Proteins Interacting Specifically with Phosphotyrosyl-Dab1
Figure 2. Dab1-Crk Family Complexes in Primary Neuronal Cultures and Developing Brain
Figure 3. The SH2 Domain of CrkL Binds to Phosphorylated Tyrosine Residues 232 and 220 of Dab1

Figure 4. Reelin Induces C3G Tyrosine Phosphorylation and Rap1 Activation
Conditional Loss of Crk and CrkL Disrupts Brain Development

Cerebellum

Hippocampus

Park and Curran 2009
Piece your data together in a rough draft story board

What story do your data tell? Or What might they be telling?

What is missing?
Activation of a Dab1/CrkL/C3G/Rap1 Pathway in Reelin-Stimulated Neurons

S1 S2 S3 S4 S5

FILL... How?

Figure 1. Purification of Mouse Embryonic Brain Proteins Interacting Specifically with Phosphorylated Dab1

Figure 2. Dab1-Crk Family Complexes in Primary Neuronal Cultures and Developing Brain

Figure 4. Reelin Induces C3G Tyrosine Phosphorylation and Rap1 Activation

Figure 5. SLC-6, Ncs-2, Sec, Cal, and Csk Most Specifically to Tyrosine-Phosphorylated Dab1 in Vivo

Figure 6. Requirement for Src Family Kinase Activity for Dab1 Binding to Cal in Response to Reelin

Figure 8. Quantification of Dab1-Cal and C3G-Cal Complexes in Embryonic Brain

Figure 10. Dab1 Binding to the SH2 Domain of CaxL, While C3G Binds to the SH3 Domain

Bryan A. Ballif,1,3 Lionel Arnaud,1,4 William T. Arthur,1 Deborah Gurus,2 Akira Imamoto,2 and Jonathan A. Cooper1,*

Current Biology, Vol. 14, 606–610, April 6, 2004
Sometimes Submission is Advisable even if there are a few holes…but they should NOT be huge holes or else…
“Never trust the storyteller. Only trust the story.”

Kurt Vonnegut (Nov. 1922 – April 2007)

- Use the time of a total stranger in such a way that he or she will not feel the time was wasted.

- Give the reader at least one character he or she can root for.

- Every character should want something, even if it is only a glass of water.

- Every sentence must do one of two things—reveal character or advance the action.

- Be a sadist. No matter how sweet and innocent your leading characters, make awful things happen to them—in order that the reader may see what they are made of.

- Give your readers as much information as possible as soon as possible. To heck with suspense. Readers should have such complete understanding of what is going on, where and why, that they could finish the story themselves, should cockroaches eat the last few pages.

“The greatest American short story writer of my generation was Flannery O’Connor… she broke practically every one of my rules but the first. Great writers tend to do that.”
Tip: "In the planning stage of a book, don't plan the ending. It has to be earned by all that will go before it." — Rose Tremain

"Listen to the criticisms and preferences of your trusted 'first readers.'" — Rose Tremain

Tip: "Be your own editor/critic. Sympathetic but merciless!" — Joyce Carol Oates

Tip: “My first rule was given to me by TH White, author of The Sword in the Stone and other Arthurian fantasies and was: Read. Read everything you can lay hands on. ..— Michael Moorcock
Tip: “Protect the time and space in which you write. Keep everybody away from it, even the people who are most important to you.”... “Work on a computer that is disconnected from the internet.” — Zadie Smith

Tip: "Always carry a note-book. And I mean always. The short-term memory only retains information for three minutes; unless it is committed to paper you can lose an idea for ever." — Will Self

Tip: "The nearest I have to a rule is a Post-it on the wall in front of my desk saying ‘Faire et se taire’ (Flaubert), which I translate for myself as ‘Shut up and get on with it.’" — Helen Simpson