

Writing a Scientific Paper

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Writing a Scientific Paper

The Process

- Plot and analyze your data
- Decide on a message
- Pick an audience (and a journal)
- Write a draft of the paper
- Have colleagues review the draft
- Re-write the paper
- Submit and await the reviews

Writing a Scientific Paper

The Main Message

- A concise and straight-forward statement of the main finding of the study.
- One simple sentence is best.
- Something you'd say to a friend or colleague to start a conversation

Should pass the "Cocktail Party Test"

Writing a Scientific Paper
The Main Message: **Examples**

- Treating insulin resistance prevents diabetes.
- Thiazolidinediones have a direct effect to slow atherosclerosis
- Angiotensin II modifies insulin-mediated glucose uptake via a hemodynamic effect
- Hispanic and African American kids generate hyperinsulinemia in different ways in response to insulin resistance

Selecting a Journal
Three Questions

- Whom do I want to read this paper?
- What journals do they read?
- What's the most prestigious journal that is likely to be interested in the paper?

Writing a Scientific Paper
Order of Writing

- Title and Authors
- Methods
- Results
- Discussion
- Introduction
- Abstract
- References
- Title (revisited)

Methods Section
General Format

- Subjects and Selection Process
- Protocol
- Lab and Analytical Methods
- Data Analysis

Methods Section
Subject Selection

- Method of Recruitment
- Relevant Entry Criteria
- IRB Approval of Project

Methods Section
Protocol

- Describe Major Procedures
- Use Logical Order (e.g., temporal)
- Detail New/Unusual Methods
- Relevant to Results and Conclusion

Methods Section

Analytical Methods

- Usually lab methods
- Detail unusual or unpublished methods
- Include source of reagents
- Cross-check with results for completeness

Methods Section

Data Analysis

- Calculations
- Statistical methods
- Define variances (e.g., sd, se)
- Define accepted level of significance

Results Section

General Approach to Writing

- List types of data to present
- Develop logical order
- List tables and figures, then make them
- Write the text (tell the story)

Maintain focus on the conclusion(s)

Results Section

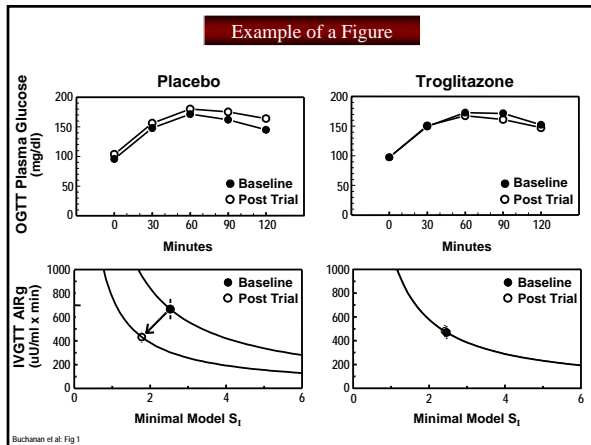
Example of a Data List

Type of Data

Presentation Format

- | | |
|---|---|
| <ul style="list-style-type: none"> ■ Baseline Characteristics ■ Characteristics on Trial ■ Diabetes Rates- On trial ■ Characteristics Post-Trial ■ Diabetes Rates – Post-trial ■ B-cell Function Post-trial | <ul style="list-style-type: none"> Table Text Figure Text Text Figure |
|---|---|

Example of a Figure



Results Section

Example of a Figure Legend

Figure 3. *Top Panels:* OGTT plasma glucose concentrations at baseline and eight months post-trial in women who participated in post-trial testing after completing the blinded trial without diabetes. The change in total glucose area between baseline and post-trial testing was significantly different between groups ($p=0.03$). *Bottom Panels:* IVGTT acute insulin response (AIRg) plotted against insulin sensitivity (S_1) at baseline and eight months post-trial. Curved lines are $y=k/x$ where "k" is product of AIRg and S_1 , representing B-cell compensation for insulin resistance. B-cell compensation fell 39% in the placebo group and 3% in the troglitazone group ($p=0.01$ between groups).

Results Section

Example of a Table with Legend

Table 2: Metabolic parameters from IVGTTs at baseline and 3 months on-trial^a

Variable ^b	Placebo Group (n=109)			Troglitazone Group (n=108)		
	Baseline	3months	p-value ^c	Baseline	3Months	p-value ^c
Fasting glucose (mg/dl)	94.3 (10.4)	97.2 (14.5)	0.009	94.5 (10.0)	91.0 (10.4)	<0.0001
Kg (min ⁻¹ x 100)	1.49 (0.40)	1.48 (0.41)	0.99	1.43 (0.41)	1.46 (0.48)	0.53
S _t (min ⁻¹ per uU/ml x 10 ⁻³)	2.34 (1.80)	2.17 (1.48)	0.17	2.60 (1.67)	3.76 (2.27)	<0.0001
Insulin area (uU/ml x min)	10518 (5544)	10701 (5673)	0.90	9402 (5504)	6551 (3644)	<0.0001
ABG (uU/ml x min)	542 (499)	534 (460)	0.91	461 (357)	406 (294)	0.10
Disposition index	995 (709)	969 (720)	0.35	987 (720)	1321 (852)	<0.0001

^a results are mean (sd) from all women who had IVGTTs at both times
^b as defined in Table 1
^c for difference from zero for change in each group between baseline and three months, by Wilcoxon signed rank test

Results Section

Example of Data in Text

The placebo and troglitazone groups were also similar with regard to compliance with study medications ($87 \pm 10\%$ vs. $85 \pm 16\%$; $p=0.30$), the fraction of women using hormonal contraception (56% vs. 46%; $p=0.23$), the fraction that became pregnant (8.2% vs. 7.1%, $p=0.81$), and weight gain from baseline to the end of the trial (1.6 ± 4.8 vs. 1.9 ± 4.0 kg/year; $p=0.60$).

Results Section

Example of Sub-Headings

- Baseline Characteristics
- Response to Blinded Treatment
- Post-trial Follow-up

Discussion Section
General Format

- Describe the main findings
- Discuss significance of each main finding
- Discuss limitations
- Discuss important “collateral” findings
- Summarize and conclude

Discussion Section
Style Tips

- Use proper grammar
- Structure paragraphs
 - ✦ Opening sentence
 - ✦ Body of supporting arguments
 - ✦ Conclusion
- Use transitional sentences

Remain focused on “the message”.

Introduction
General Format

- Broad statement about the problem/disease
- Review of knowledge relevant to your study
- Statement about gaps/controversies
- Thus, the purpose of this study... (fill a gap)

Abstract

General Format

- Purpose
- Methods
- Results
- Summary and Conclusion(s)

Example of a Title Page

Preservation of Pancreatic *B*-cell Function and Prevention of Type 2 Diabetes by Pharmacological Treatment of Insulin Resistance in High-Risk Hispanic Women

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Running Head: Prevention of type 2 diabetes
Key Words: Diabetes prevention, insulin resistance, insulin secretion, gestational diabetes mellitus, pancreatic *B*-cell
Word Counts: Abstract = 269, Introduction through Discussion = 4,453

Example of Acknowledgements

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References

Guidelines

■ For Introduction

- ✦ Necessary background
- ✦ Most important/definitive works
- ✦ Be mindful of potential reviewers

■ For Methods

- ✦ Prior descriptions of your cohort/methods
- ✦ Unusual or complicated methods from others

■ For Discussion

- ✦ Similar or contrasting results
- ✦ Support for arguments/statements
- ✦ Potential reviewers
