Universitas Sumatera Utara

Transformation Towards the Ultimate

Kampus Merdeka INDONESIA JAYA

Penulisan Result dan Discussion

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USU Menulis Seri VIII

Lembaga Inovasi Penulisan Ilmiah dan Hak Kekayaan Intelektual (LIPIHKI) USU

LIPIHKI USU, 28 Mei 2025

Kemampuan akhir yang diharapkan:

1. **Menjelaskan fungsi dan tujuan** dari bagian *Results* dan *Discussion* dalam artikel ilmiah.
2. **Menulis bagian *Results* secara sistematis** dengan menyajikan data yang lengkap, relevan, dan objektif, serta memilih format yang tepat (teks, tabel, atau figur).
3. **Membedakan antara tren dan data mentah** dalam penyajian hasil penelitian.
4. **Menggunakan *tenses* yang sesuai** dalam menulis bagian *Results* dan *Discussion* (past, present, future tense).
5. **Menerapkan aturan statistik dasar** dalam pelaporan hasil dengan tepat.
6. **Menafsirkan hasil penelitian secara kritis** dalam bagian *Discussion* dengan menghubungkannya ke teori/literatur, menjelaskan signifikansi hasil, serta menyampaikan keterbatasan dan arah penelitian selanjutnya.

Body of a manuscript

- An article begins with the Title, Abstract and Keywords.

- The article text follows the **IMRAD**, which responds to the questions below:
- **I**ntroduction: What did you/others do? Why did you do it?
- **M**ethods: How did you do it?
- **R**esults: What did you find?
- **A**nd **D**iscussion: What does it all mean?

- The main text is followed by the Conclusion, Acknowledgements, References and Supporting Materials.

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Darimana harus memulai?



Darimana harus memulai?

1. Prepare the **figures and tables**.
2. Write the **Methods**.
3. Write up the **Results**.
4. Write the **Discussion**. Finalize the Results and Discussion before writing the introduction. This is because, if the discussion is insufficient, how can you objectively demonstrate the scientific significance of your work in the introduction?
5. Write a clear **Conclusion**.

Darimana harus memulai?

6. Write a compelling **Introduction**.
7. Write the **Abstract**.
8. Compose a concise and descriptive **Title**.
9. Select **Keywords** for indexing.
10. Write the **Acknowledgements**.
11. Write up the **References**.

Result

- **Tujuan utama:**
  - Menjawab pertanyaan **"Apa yang Anda temukan?"**

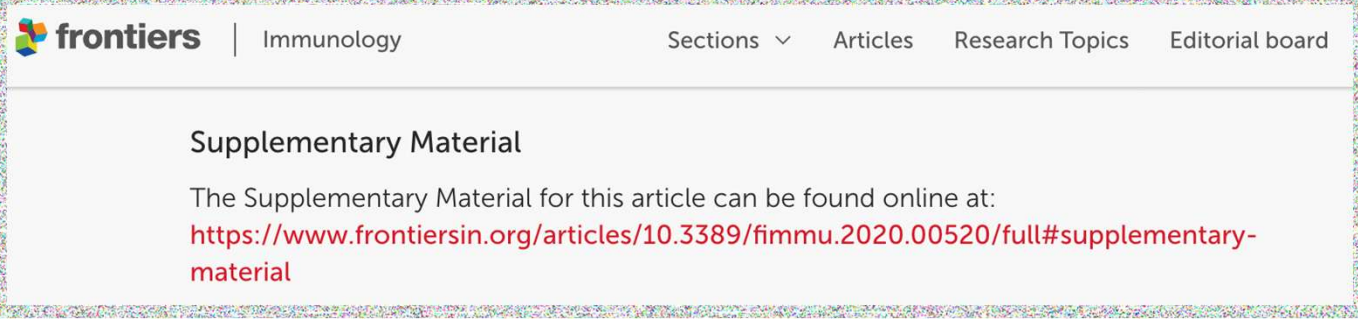
2.2. Validation of the Human DRD4-Tango System In Vitro

To evaluate whether DRD4-Tango could report cellular activation by dopamine, we co-expressed human DRD4-Tango with a lexAop-luciferase reporter in *Drosophila* S2 cells. Upon treatment with dopamine, we observed an increase in reporter gene expression within 1 h of incubation (**Figure 2**a). However, no significant changes in reporter gene expression were detected after 2, 3, and 16 h of incubation (**Figure 2**b–d). These findings demonstrate that (1) the combination of human DRD4 and arrestin functions effectively to establish a viable Tango system, and (2) human DRD4-Tango successfully activates reporter gene expression in response to dopamine receptor ligands.

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Result

- **Data harus lengkap, akurat, dan objektif**
- **Hanya tampilkan hasil yang penting dan relevan**
  - Hasil yang menjadi dasar diskusi
  - Hasil pendukung yang kurang penting → masukkan ke **Supporting Materials**
- **Jangan "sembunyikan" data untuk publikasi selanjutnya**
  - Data tambahan tetap bisa dimasukkan di **supplementary materials**
  - Data yang tidak dilaporkan = kehilangan bukti untuk menguatkan kesimpulan



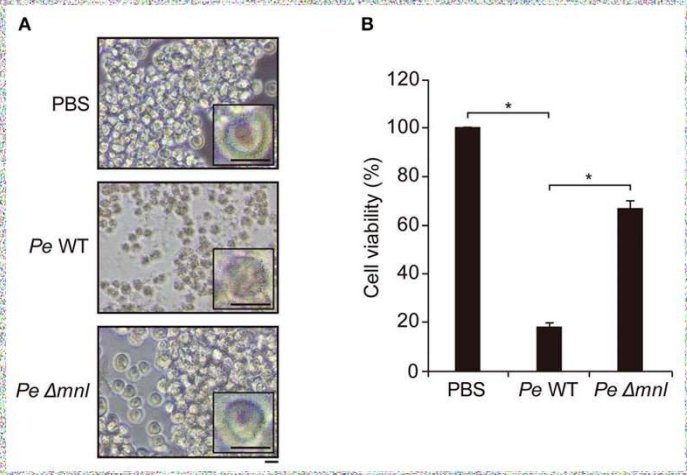
Result

- **Disajikan dengan tabel, gambar, atau grafik yang sesuai**

Table 1. Purification of pro-Monalysin.

Fraction		Total protein (mg)	Total activity[a] (units)	Specific activity[b] (units/mg protein)	Purification (fold)	Yield (%)
I	Total lysate	3.5	3.1×10^3	8.7×10^2	1.0	100
II	25–50% $(NH4)_2SO_4$ ppt[c]	2.6	1.7×10^3	6.8×10^2	0.78	57
III	Anion exchange HPLC	2.3×10^{-1}	1.6×10^3	7.0×10^3	8.0	52
IV	0–50% $(NH4)_2SO_4$ ppt	6.0×10^{-2}	4.7×10^2	8.4×10^3	9.7	16
V	Gel filtration HPLC	2.0×10^{-2}	1.8×10^2	1.2×10^4	14	6

[a] *Total activity was calculated as 1 unit corresponding to activity that yields 70% cell viability.*
[b] *Specific activity indicates total activity divided by total protein.*
[c] *ppt: precipitate.*



Tips Menulis Bagian Results

- Hasil ditulis sesuai dengan ***research question***
- Identifying trends
- Organizing trends : Alur data harus **jelas dan mudah diikuti**
- Reporting trends
- Indicating the degree of difference
- Use Figures and Tables
- Connecting the Figure(s) or Table(s) to the text

Tips Menulis Bagian Results

- **Gunakan sub-judul**
  - Memudahkan pembaca melihat struktur data
  - Gunakan penomoran sesuai panduan jurnal (Guide for Authors)
- **Jangan gunakan lokasi ketika merujuk ke Gambar atau Tabel,** misalnya: “..... disajikan di Gambar 1 di bawah ini.” tetapi cukup “...disajikan di Gambar 1.” atau “.....(Gambar 1).”.
- **Jangan masukkan referensi ke literatur lain**
  - Bagian Results hanya menyajikan **data sendiri**
  - Diskusi data → di bagian Discussion

Trend or Raw Data?

- **At the 10th minute of the practical session**, two participants had completed the task, while four were still working.
- **The pH level of the solution peaked at 7.8 after 30 seconds**, then gradually decreased to 6.2 over the next 3 minutes.
- **Throughout the 5-day observation**, bacterial colony size increased from an average of 2 mm to 6 mm, plateaued on day 4, and slightly declined on day 5.
- **Female students showed a higher engagement rate than male students**, with more frequent participation in Q&A sessions.

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Figures and Table

Figure and table legends must be self-explanatory

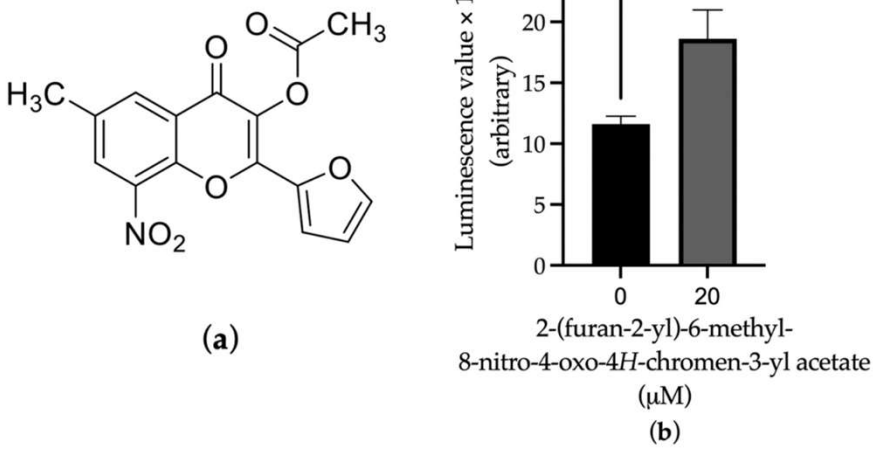
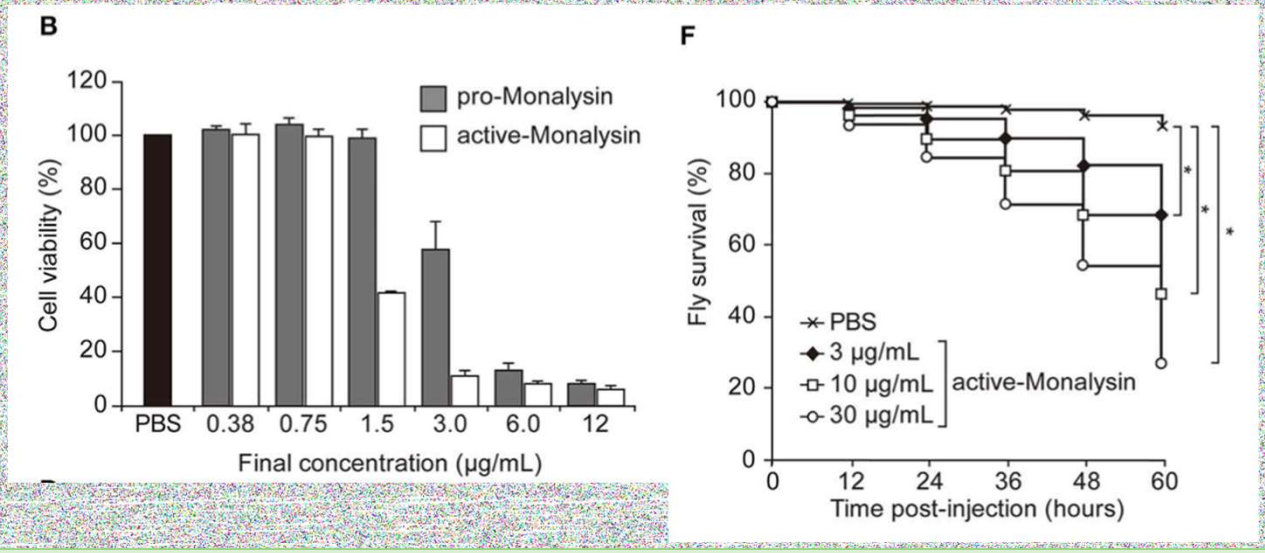


Figure 4. Activation of DRD4 by a Novel Compound. (**a**) Chemical structure of 2-(furan-2-yl)-6-methyl-8-nitro-4-oxo-4*H*-chromen-3-yl acetate (**b**) DRD4-hTango reporter (luciferase) activity in response to 2-(furan-2-yl)-6-methyl-8-nitro-4-oxo-4*H*-chromen-3-yl acetate in *Drosophila* S2 cells co-transfected with pMT-GAL4, UAS-DRD4-Tango, and LexAop-Luc following 1 h of incubation. Error bars represent the standard error of the mean (SEM). Asterisks represent statistically significant differences ($p < 0.05$, *t*-test, $n = 3$).

Figure and table legends must be self-explanatory



- **FIGURE 2 |** Trypsin treatment transforms purified pro-Monalysin into its active-form. **(A) … (B)** Cell viability after incubation with pro-Monalysin and active-Monalysin. S2 cells (1.5×10^5 cells in 100 µL) were incubated with the indicated concentration of pro-Monalysin or active-Monalysin for 18 h, cell viability was measured via a CellTiter-Glo Luminescent Cell Viability Assay. Cell viability is shown, relative to luminescence in cells incubated with PBS, taken as 100%. … **(F)** Survival analysis of adult flies upon injection with active-Monalysin (3–30 µg/mL) at indicated time points (*$P < 0.0001$, as determined by a log-rank test).

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[a] *Total activity was calculated as 1 unit corresponding to activity that yields 70% cell viability.*
[b] *Specific activity indicates total activity divided by total protein.*
[c] *ppt: precipitate.*

- 1. The title clearly describes what the table is about.
- 2. The column heads are descriptive and clearly indicate the nature of the data presented.
- 3. The data is divided into categories for clarity.
- 4. It is self-contained and can be understood quite well even without reference to the entire paper.
- 5. Superscript letters and notes are used to offer additional, clarifying information.
- 6. Sufficient spacing is present between columns and rows; the layout is clean, and the font is legible.

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Figures and Table

1. **Pertimbangan utama saat menulis bagian hasil** adalah memilih antara mendeskripsikan hasil dalam teks, atau menggunakan tabel/gambar.
2. **Hasil yang dapat dijelaskan dalam satu atau dua baris** sebaiknya ditulis langsung dalam teks.
3. **Tabel digunakan untuk menyajikan data** seperti karakteristik dasar, hasil, atau pengobatan, terutama jika variabel yang sama dijelaskan untuk dua atau lebih kelompok.
4. **Tabel biasanya memuat hasil yang paling penting** dan seharusnya cukup jelas untuk memberikan gambaran temuan kepada pembaca tanpa perlu penjelasan tambahan.

Table 1. Characteristics of the T2DM outpatients (n = 106).

Characteristics	Male (%)	Female (%)
Age of the patients (years):		
18–30	0.94	1.88
31–40	2.83	0.00
41–50	2.83	2.83
51–60	19.81	24.52
61–70	16.98	21.69
>70	1.88	3.77
Total	45.28	54.72
Mean age of the T2DM outpatients	58.61 ± 8.89 (years)	
Comorbidities (%):		
Hypertension	57.5	
Diabetic neuropathy	35.8	
Congestive heart failure	24.5	
Dyslipidemia	18.9	
Others	34.9	

Figures and Table

5. **Gambar digunakan ketika data terlalu kompleks** untuk disajikan dalam bentuk tabel atau sulit diinterpretasikan.
6. **Relasi dan tren lebih baik disajikan dalam bentuk gambar** karena lebih mudah dipahami secara visual.
7. **Jumlah ilustrasi (tabel dan gambar)** mungkin dibatasi oleh jurnal tujuan, jadi penting untuk memeriksa panduan terlebih dahulu.
8. **Hindari penggunaan ilustrasi yang berlebihan**, agar tetap menarik dan tidak membosankan bagi pembaca.
9. **Jangan mengulang data dalam teks** yang sudah ditampilkan di dalam tabel atau figur.
10. **Tabel dan Gambar disitasi didalam teks.**

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Figures and Table

Microsoft Powerpoint

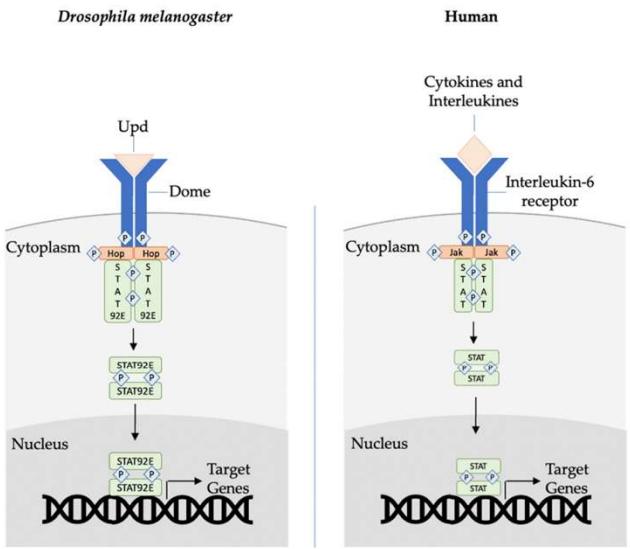


Figure 1. The Jak/STAT signaling core components of *Drosophila* and their human homologs. Upd (Interleukin or cytokine in humans) binds to its signaling receptor Dome (interleukin-6 receptor in humans), activating the associated Hop (Jak1, 2, 3, tyrosine kinase 2 in humans), and initiating a cascade of actions. Activated Jak phosphorylates other Jaks and the receptor, thereby forming a STAT protein-binding site. The phospho-STATs undergo dimerization and nuclear translocation. The STAT DNA-binding domain identifies promoter and enhancer regions of target genes, hence activating their transcription.

Biorender.com

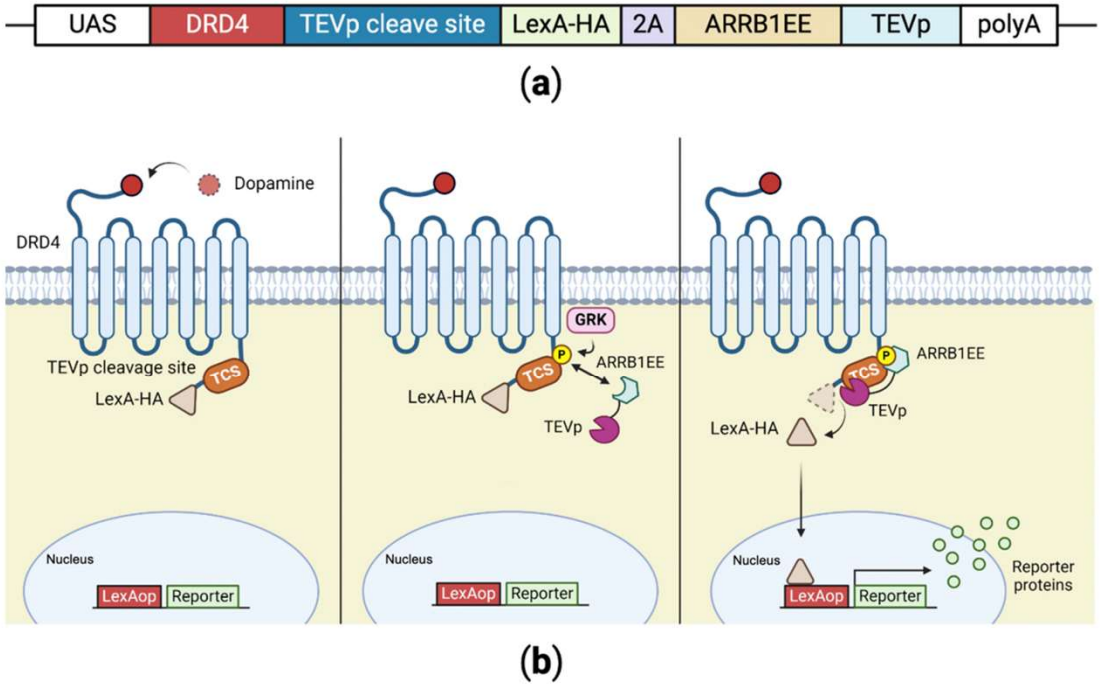


Figure 1. Schematic Diagram of the human DRD4 Tango System. (**a**) Design of the human DRD4 Tango transgene. (**b**) Illustration of the DRD4-hTango mechanism (Created with BioRender.com).

Tenses of the result and Discussion section

1. Use simple past tense to describe completed experiments in the Results section

- Karena eksperimen telah dilakukan sebelum penulisan, gunakan past tense untuk mendeskripsikan hasil.
- **Example**: *Overall, there **was** a significant reduction in the blood pressure of more than 60% of the patients.*

2. Use present tense when referring to tables, figures, or graphs

- Saat menyebutkan atau menjelaskan isi dari tabel/grafik yang disajikan, gunakan present tense.
- **Example**: *Table 4 **shows** the blood pressure levels of patients before and after administration of the recommended dose of the drug.*

Tenses of the result and Discussion section

3. In the Discussion section, use past tense to summarize your findings

- Ketika merangkum temuan dari hasil penelitian, gunakan past tense.
- **Contoh bagian pertama dari kalimat berikut**: *63% of the children **demonstrated** an elevated level of at least one risk factor, indicating that children with obesity are at an increased risk of cardiovascular diseases.*

4. Use present tense to interpret the significance of the results in the Discussion

- Saat menjelaskan arti atau implikasi dari hasil, gunakan present tense.
- **Contoh bagian kedua dari kalimat berikut:** *63% of the children demonstrated an elevated level of at least one risk factor, indicating that children with obesity **are** at an increased risk of cardiovascular diseases.*

Tenses of the result and Discussion section

5. Use future tense to suggest directions for future research

- Saat membuat rekomendasi atau menyarankan penelitian selanjutnya, gunakan future tense.
- **Example**: *The methods reported here **will** open up avenues for further research in the field.*

Statistics Rules

1. Sebutkan uji statistik yang digunakan beserta semua parameter yang relevan.

- Contoh: mean dan standar deviasi (SD) → 44% (±3)
- Contoh: median dan rentang persentil → 7 tahun (4,5 – 9,5 tahun)

2. Gunakan mean dan standar deviasi untuk melaporkan data yang berdistribusi normal (simetris dan bell-shaped).

3. Gunakan median dan rentang persentil untuk melaporkan data yang skewed (tidak normal) atau memiliki sebaran data yang tidak simetris.

- Data: 3, 4, 5, 6, **100 (Data tidak terdistribusi normal)**
- Mean = (3+4+5+6+100)/5 = 23.6 → **terpengaruh outlier**
- Median = 5 → **tetap stabil**

Statistics Rules

4. Untuk angka, gunakan dua angka signifikan kecuali jika memang perlu presisi lebih tinggi.

- Contoh: tulis 2.08 daripada 2.07856444.

5. Hindari penggunaan persentase untuk sampel yang sangat kecil.

- Contoh: tulis “satu dari dua” bukan 50%.

Discussion

Tujuan Bagian Discussion

- Menjelaskan arti hasil
- Mengaitkan dengan teori/penelitian sebelumnya
- Menunjukkan kontribusi penelitian

Discussion

- **Struktur Umum Discussion**
  1. Ringkas temuan utama
  2. Jelaskan signifikansi hasil
  3. Bandingkan dengan studi lain (literatur)
  4. Jelaskan implikasi / aplikasi hasil
  5. Kelemahan & keterbatasan studi
  6. Arah penelitian selanjutnya

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Struktur Umum Discussion

- 1 Ringkas temuan utama
  2 Jelaskan signifikansi hasil
  3 Bandingkan dengan studi lain (literatur)
  4 Jelaskan implikasi / aplikasi hasil

3. Discussion

1

The successful validation of the DRD4-Tango system in *Drosophila* S2 cells is consistent with previous studies that have utilized the Tango assay in mammalian cells. The Tango system has previously been employed in mammalian cell lines, such as HEK293 cells, to study GPCR activity, where it has demonstrated high sensitivity and specificity for detecting receptor–ligand interactions [12,22]. Our current study extends this application to *Drosophila* S2 cells, demonstrating that the Tango system in these cells provides an adequate platform for studying human GPCRs and their ligands. These findings establish that *Drosophila* S2 cells represent a reliable model for human GPCR research, offering an alternative to mammalian systems with significant advantages including easier culture conditions and genetic manipulation.

1
3
2
4

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Struktur Umum Discussion

5 Kelemahan & keterbatasan studi

6 Arah penelitian selanjutnya

The challenges encountered in detecting DRD4 activation in vivo highlight potential limitations in the current approach, contrasting with the relatively straightforward results obtained in vitro. This discrepancy suggests that certain factors, such as low expression levels of the DRD4 receptor or suboptimal experimental conditions, may have contributed to the failure of the in vivo experiments. For instance, receptor expression in the in vivo system may have been insufficient to produce a detectable signal, which could be resolved by optimizing the transfection protocol or using stronger promoters to drive receptor expression. Additionally, the experimental conditions, including the duration of ligand exposure or temperature during the assay, may not have been optimal to support receptor–ligand interactions in vivo, necessitating further protocol adjustments. While previous studies have reported that translating in vitro findings to in vivo systems often requires significant optimization [22], our observations reinforce the importance of tailoring experimental designs for in vivo applications. Moving forward, efforts should focus on refining receptor expression strategies and optimizing assay conditions. These improvements are essential to realizing the full potential of the DRD4-Tango system as a robust tool for in vivo studies.

5

6

Kesimpulan

- **Results menjawab "apa yang ditemukan"**
  → Disajikan secara objektif, lengkap, dan relevan, tanpa interpretasi.
- **Gunakan format yang tepat (teks, tabel, atau gambar)**
  → Tergantung kompleksitas data dan pola tren yang ingin disampaikan.
- **Bedakan antara data mentah dan tren**
  → Tren membantu pembaca memahami arah atau pola hasil.
- **Gunakan tenses yang sesuai**
- *Past tense*: menjelaskan hasil eksperimen
- *Present tense*: merujuk tabel/figur dan interpretasi
- *Future tense*: saran penelitian lanjutan

Kesimpulan

- **Discussion menjelaskan makna hasil**
  → Ringkas temuan utama, jelaskan signifikansi, bandingkan dengan literatur, dan uraikan kontribusi penelitian.
- **Sampaikan keterbatasan dan arah penelitian selanjutnya**
  → Tunjukkan refleksi kritis terhadap penelitian.
- **Gunakan statistik secara tepat**

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Refererences

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