GenSmart™ Design Tool

Quick User Guide

GenSmart™ Design is a free online DNA construct design tool developed by GenScript. It integrates a variety of utilities for vector design, providing researchers with a comprehensive one-stop solution for all their design needs.

Advanced Vector Selection:
Efficiently categorize vectors for diverse applications, enabling users to easily choose the best option for their specific downstream needs.

Comprehensive Design Tools:
- Codon Optimization
- Reverse Complement Sequence Conversion
- GC Content Calculator

Customer-friendly Service Experience:
- Free Online Design & Map Download
- Seamlessly Designs to Orders Conversion

Workflow Overview: Design in 3 steps, order in 5!

① **Vector Choose**

Based on your application, select the backbone from extensive vectors.

② **Vector Design**

Design your vector by editing the components on the vector.

③ **Design Completed**

Check your design and download for free.

④ **Plasmid Setup & Add-ons**

Customize your product QC standards.

⑤ **Order or Get a Quote**

Receive estimated pricing and turnaround time.

Design completed in 3 steps

Step 1: Choose Your Vector to Start Design

- **Vector Design Tab** segments the vectors into various applications to facilitate users in selecting the appropriate one based on downstream applications (see **Figure 1**). Click the ⓘ icon to view vector details. After selecting a vector, click on the vector card to start design.
- **My Design Tab:** All the vectors you design will be automatically saved in this module once you sign in. You can also find the details of the plasmids you have ordered here.

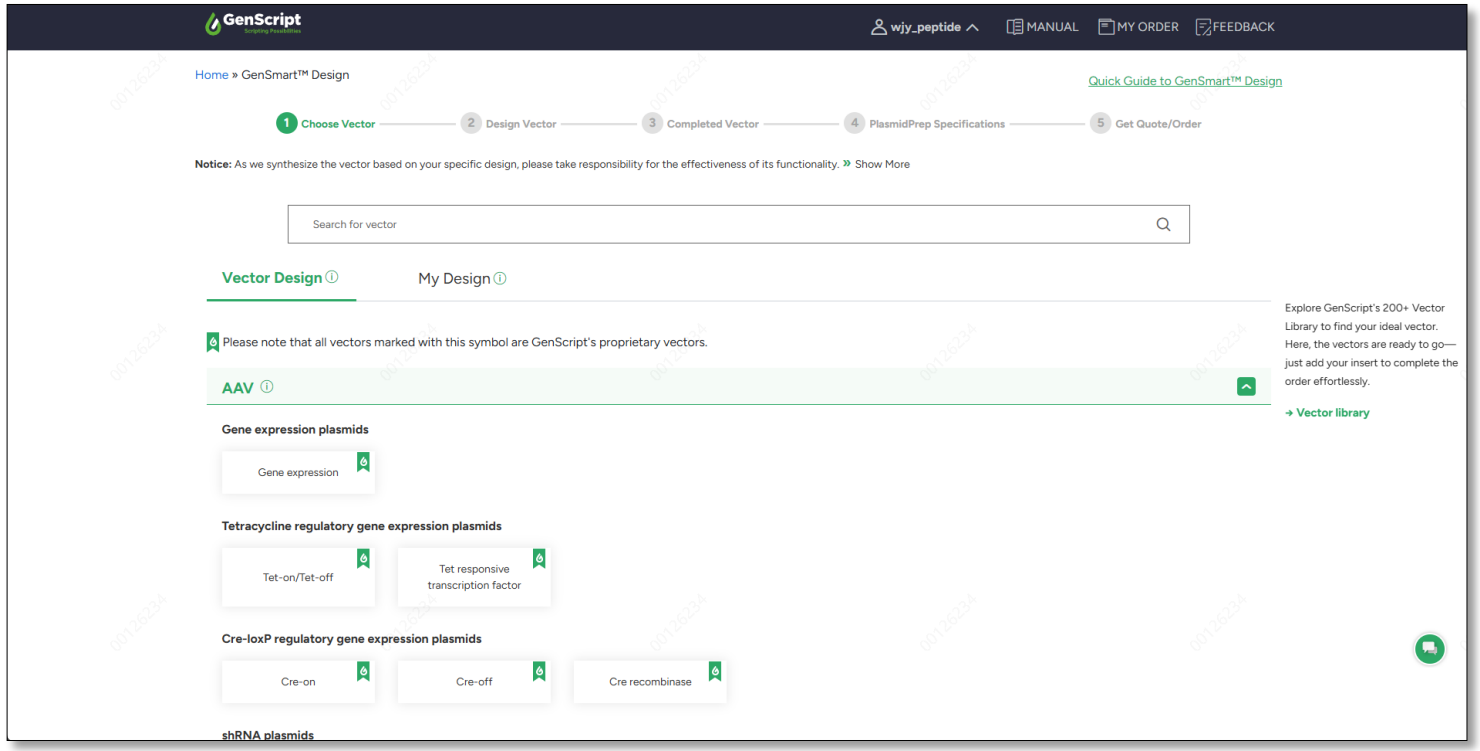

Figure 1: Vector design tab.

For more intricate vector design projects, switch to our Vector Design platform. Here, you'll find GenScript's proprietary vectors and specialized vectors for different applications. Simply click the vector card that aligns with your specific application and begin designing.

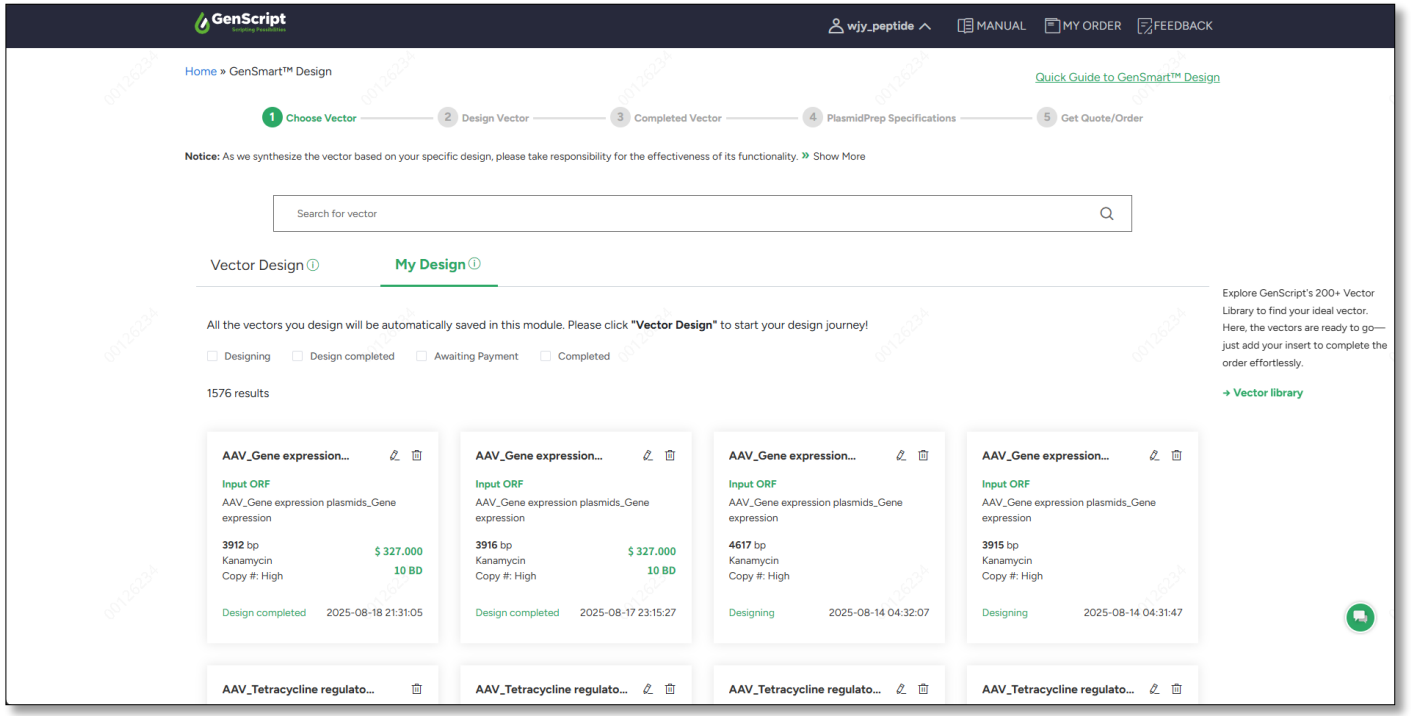

Figure 2: My design tab.

All the vectors you design will be automatically saved in this module once you sign in. You can find the vectors you have yet to complete designing here and continue your work.

Step 2: Start your vector design!

- On this page (see **Figure 3**), the left part displays the map of the selected vector, while the right part shows the relevant sequence. Click on the *Input ORF buttons in the map to insert your desired components. Buttons marked with an asterisk * indicate that these components are required.
- You can select components from our database or input a customized sequence as needed. When inputting a customized sequence, you can use all the design tools integrated on this page once you sign in (see **Figure 4**).

➢ **Codon Optimization**: Convert your protein sequence into nucleotides.

- **Check Sequence**: Detect the synthesis difficulty of the input gene, which will serve as the basis for the gene synthesis quotation.
- **View the reverse complementary sequence**: Allow you to view the reverse complementary sequence of your input gene for your needs.

- After finishing your design, you can click on the “View ORF” button to view the ORF region in your insert to check if everything is right (see **Figure 5**).
- In the end, click on the “Design Completed” button to move to the next page.

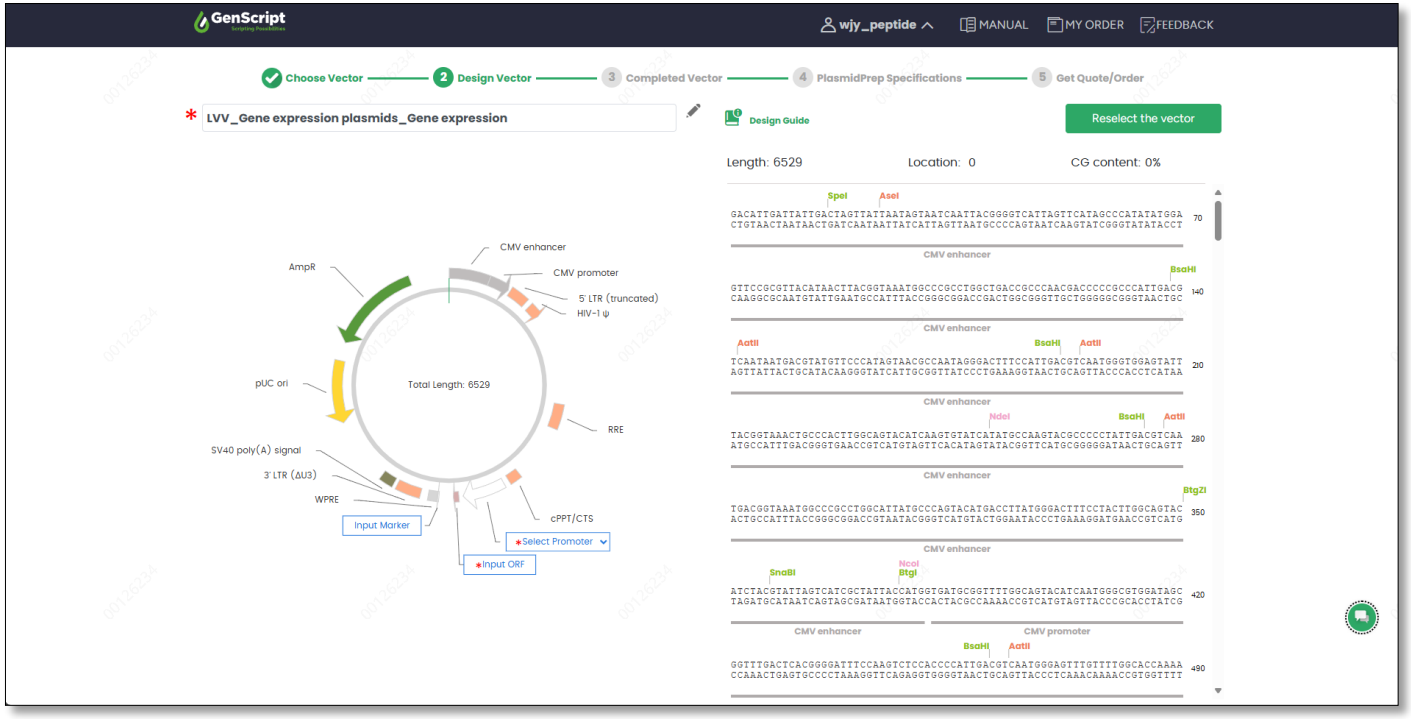

Figure 3: Vector design page.

The left part displays the map of the selected vector, while the right part shows the relevant sequence. You can see the role of each component on the vector by hovering the mouse over the component name.

Click on the buttons in the map to insert your desired components. Buttons marked with an **asterisk** * indicate that these components **are required**.

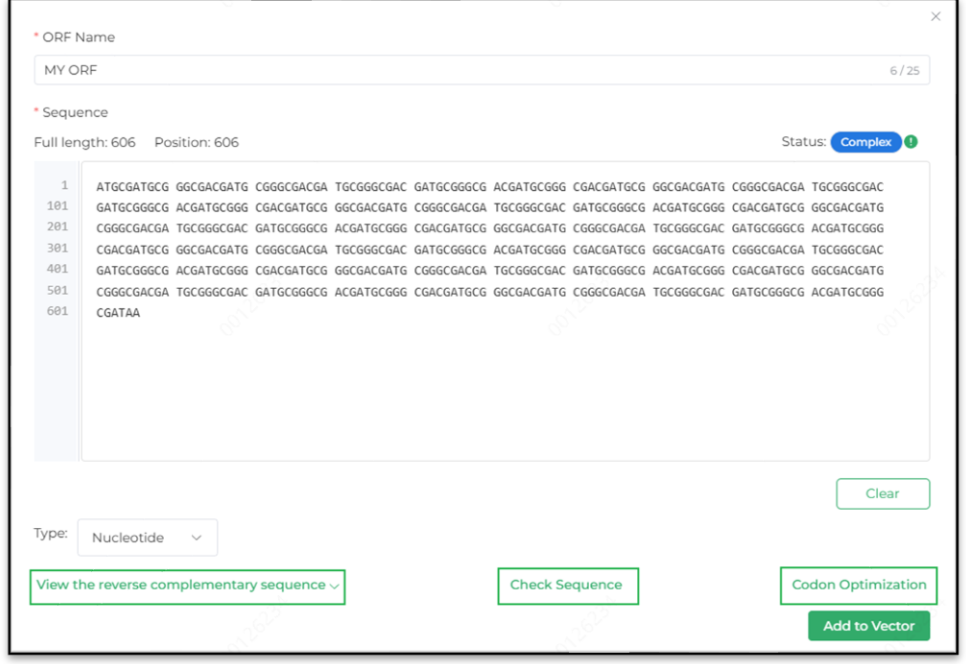

Figure 4: Input Sequence Popup.

It has many built-in design tools for your convenience. After modifying your gene name and inserting the sequence, click the **"Add to Vector"** button to insert the sequence into the vector.

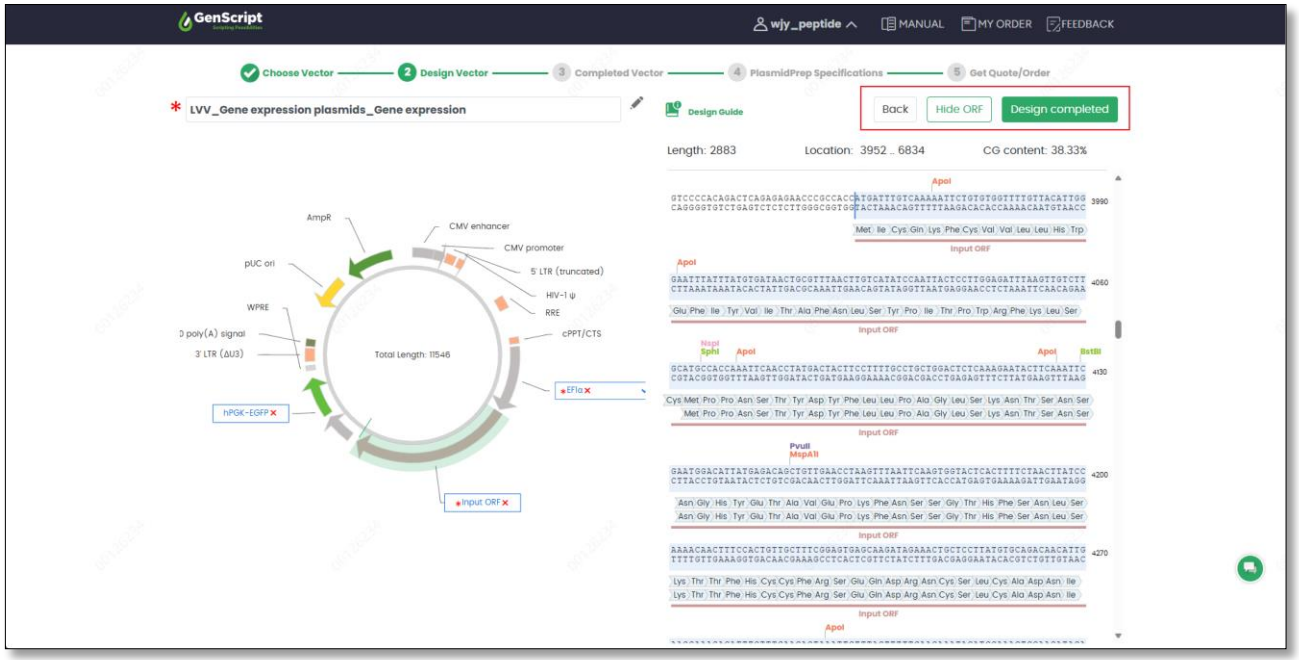

Figure 5: After finishing design.

You can click on the **“View ORF”** button to view the ORF region in your insert to check if everything is correct. Additionally, clicking the “Hide ORF” button will hide all translations of the vector. Once you have completed your design, click on the **“Design Completed”** button to proceed to the next page.

Step 3: Vector construction completed

- On this page (see **Figure 6**), you can download your design for free or save it to your account. The production price and lead time of your design's vector will be displayed on the right side. By scrolling down the page, you can view all the detailed information of the vector.
- If you want to convert your design into an order, click on the "Order" button to the next step.

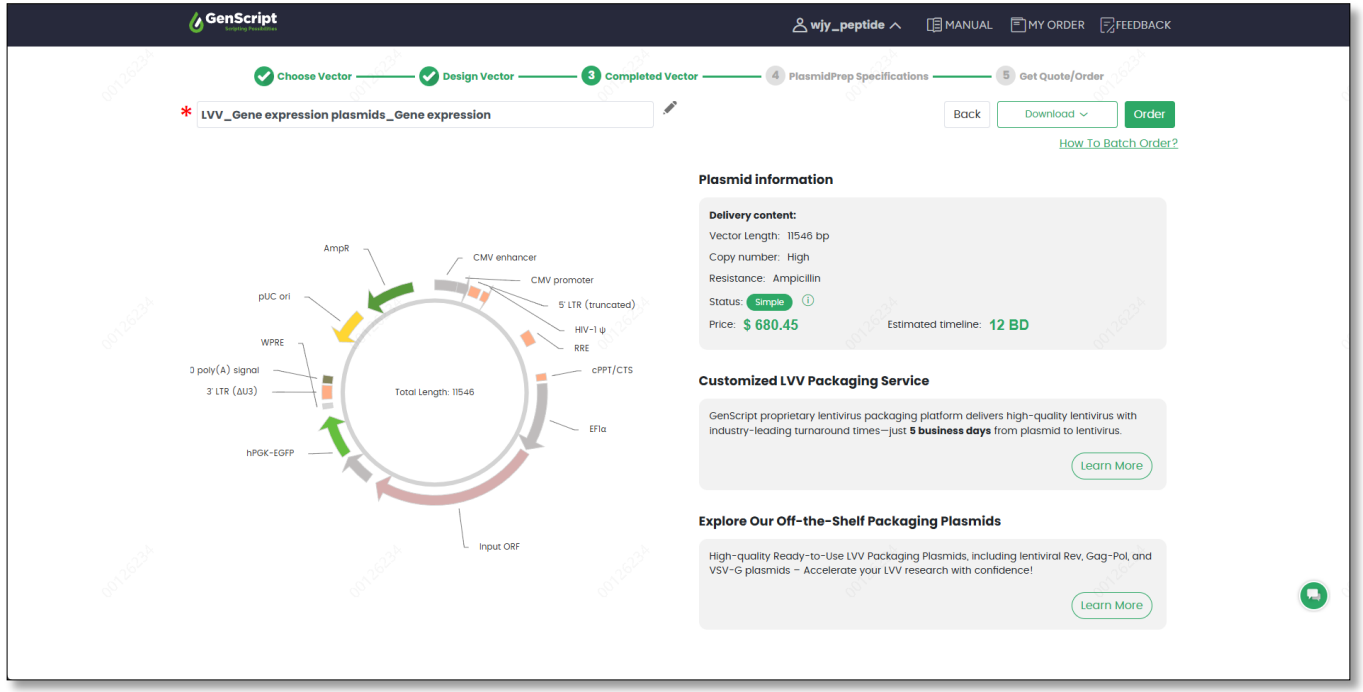

Figure 6: Design completed page.

This page is the end of your design journey. You can download your design for free or save it to your account for review next time.

The price and production time of the product will be shown on the right side. If you want to receive a physical copy of your design, please click the **"Order"** button to seamlessly enter our ordering page.

Step 4: Plasmid Setup and Add-ons

- If you need customized plasmid configurations, please modify the plasmid settings or add add-on services on this page (see **Figure 7**).
- It's worth mentioning that for AAV vectors, we recommend you select the ITR Guarantee service to ensure the integrity of your ITR sequence on the vectors.

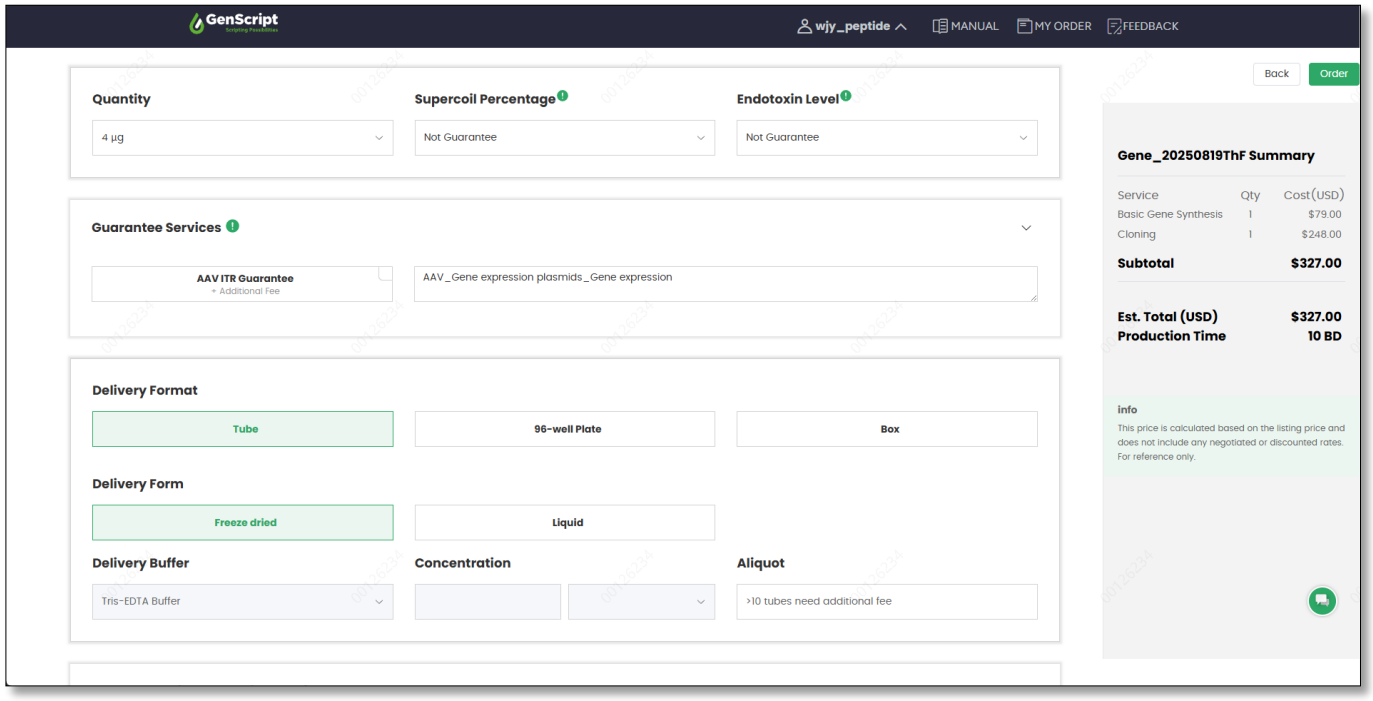

Figure 7: Plasmid setting page.

The default plasmid DNA quantity is **4 μg** for high-copy plasmids, but you can add buddled plasmid DNA preparation services to acquire high-quality gram-level plasmid DNA. Select the **quantity**, **supercoil percentage** and **endotoxin level** for your clonal genes based on your downstream application requirements.

Choose the delivery format and form for your plasmid DNA, and you can also customize the buffer and concentration.

It's worth mentioning that for **AAV vectors**, we recommend you select the **ITR Guarantee service** to ensure the integrity of your ITR sequence on the vectors. Good ITR integrity is essential for efficient rAAV packaging.

Step 5: Seamlessly place an order or request a quote

- Check the order summary, available coupons and pricing agreement contracts, turnaround time, and estimated cost that showing on the right side of the page (see **Figure 8**).
- Add new addresses or edit existing ones, by clicking "Management" next to the shipping address and billing address. For the shipping option, click "Edit" to select your preferred choice.
- Once you have everything set up, click **"Order Now"** to place your order, or if you prefer to receive a detailed quote first, click **"Get Quote"** to request a quote for your order.

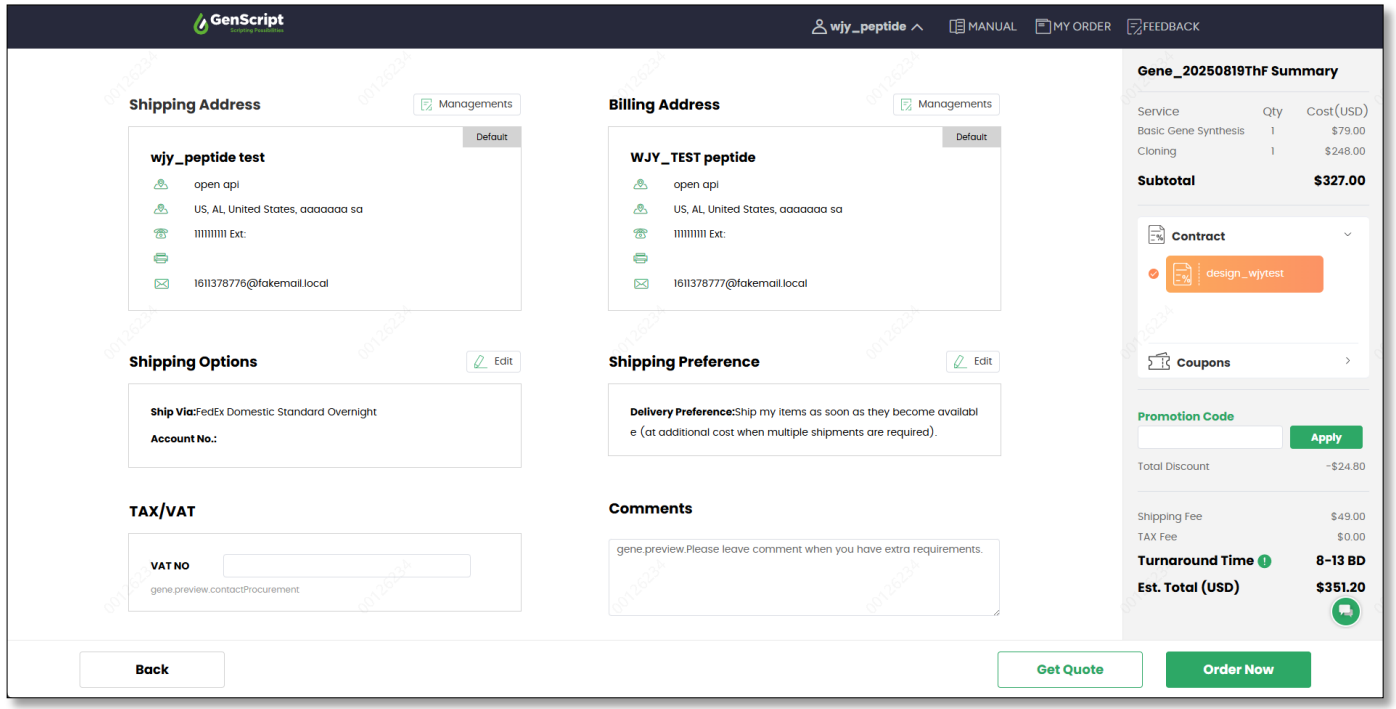

Figure 8: Available pricing agreement contracts and coupons, shipping address, billing address and shipping options. Select one available contract or coupon. Fill the shipping address and billing address, as well as select the shipping options for your order.

- You can use the existing payment method, or add new a new payment method on the payment page (see **Figure 9**). Then, click **“Checkout”** to place an order. Your order number will be shown on the new page (see **Figure 10**). You can click **“View My Order"** to keep track of your ongoing and past orders, or click **“Design A New Vector”** to get back to the vector-list page.

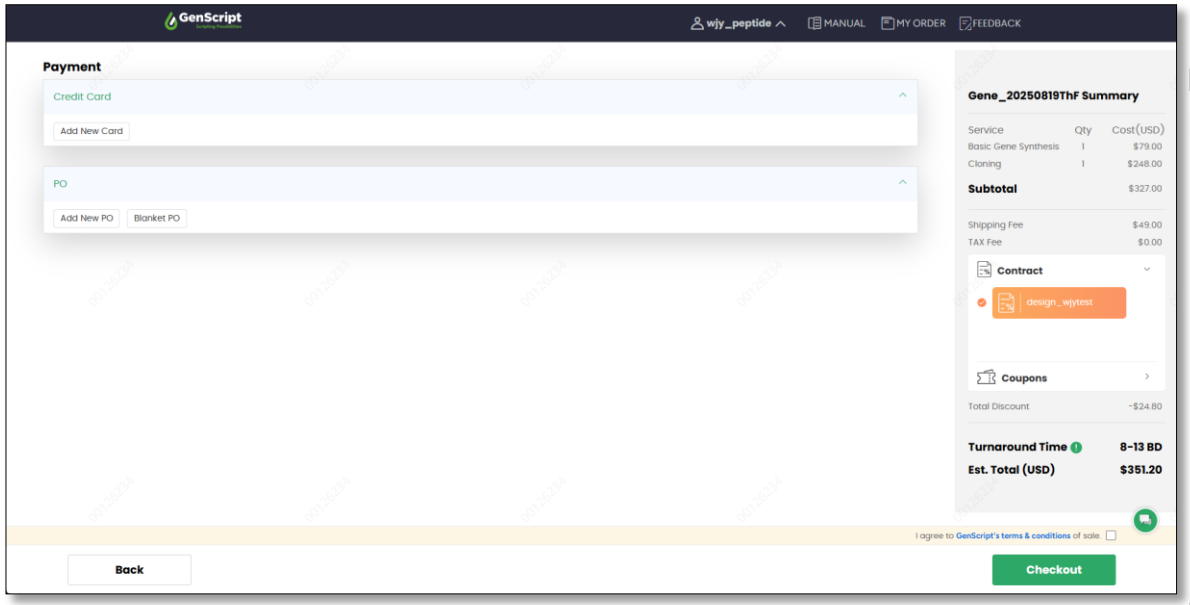

Figure 9: Payment. Use existing payment method, or add new a new payment method.

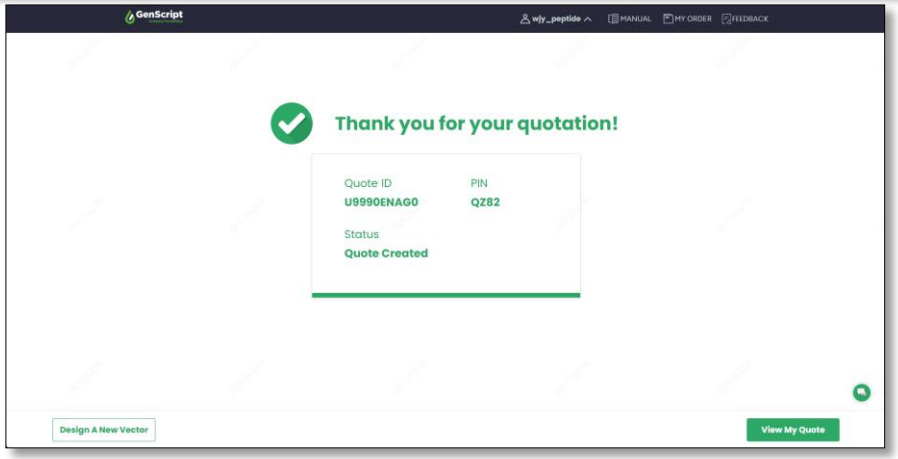

Figure 10: Order and Quotation summary page. Click “View My Order" to keep track of your ongoing and past orders, or click “Design A New Vector” to get back to the vector-list page.