To estimate the **Potential Peak Sales** for **nogapendekin alfa inbakicept-pmln (Anktiva)** in the indication of BCG-unresponsive non-muscle invasive bladder cancer (NMIBC) with carcinoma in situ (CIS) in the US, EU5 (Germany, France, Italy, Spain, UK), China, and Japan, as well as the **$ value of a 1% share of treated patients** in these geographies, we need to follow a structured approach. Since exact patient numbers, pricing, and market penetration data specific to this drug and indication are not publicly available in real-time, I will base the analysis on reasonable assumptions, epidemiology data, and market trends for NMIBC and novel therapies. Let's break this down step by step.

Step 1: Define the Target Population

Indication: BCG-unresponsive NMIBC with CIS (with or without papillary tumors).

- NMIBC accounts for approximately 75-80% of bladder cancer cases, and CIS is a subset of high-risk NMIBC.

- BCG-unresponsive patients are those who have failed BCG therapy, a first-line treatment for high-risk NMIBC. Estimates suggest that 30-40% of high-risk NMIBC patients fail BCG therapy.

- We will estimate the number of BCG-unresponsive NMIBC patients with CIS in each geography.

Epidemiology Estimates for Bladder Cancer

- **US**: Incidence of bladder cancer is ~81,000 new cases/year (American Cancer Society, 2023). ~75% are NMIBC (~60,750 cases). High-risk NMIBC (including CIS) is ~30% of NMIBC (~18,225 cases). BCG-unresponsive is ~30-40% of high-risk cases (~5,467 to 7,290 patients/year).

- **EU5**: Incidence of bladder cancer is ~151,000 new cases/year (EU data). ~75% NMIBC (~113,250 cases). High-risk NMIBC ~30% (~33,975 cases). BCG-unresponsive ~30-40% (~10,192 to 13,590 patients/year).

- **China**: Incidence of bladder cancer is ~80,000 new cases/year (GLOBOCAN 2020). ~75% NMIBC (~60,000 cases). High-risk NMIBC ~30% (~18,000 cases). BCG-unresponsive ~30-40% (~5,400 to 2,400 patients/year).

- **Japan**: Incidence of bladder cancer is ~22,000 new cases/year (GLOBOCAN 2020). ~75% NMIBC (~16,500 cases). High-risk NMIBC ~30% (~4,950 cases). BCG-unresponsive ~30-40% (~1,485 to 1,980 patients/year).

Total Incident BCG-Unresponsive NMIBC with CIS (Midpoint Estimate)

- US: ~6,378 patients/year

- EU5: ~11,891 patients/year

- China: ~6,300 patients/year

- Japan: ~1,732 patients/year

- **Total**: ~26,301 patients/year

However, since CIS is a subset of high-risk NMIBC, and not all BCG-unresponsive patients have CIS, we assume ~50% of BCG-unresponsive high-risk NMIBC patients have CIS (based on clinical literature):

- US: ~3,189 patients/year

- EU5: ~5,945 patients/year

- China: ~3,150 patients/year

- Japan: ~866 patients/year

- **Total CIS Population**: ~13,150 patients/year

Since this is an annual incidence, and treatment may span multiple years or involve prevalent cases (existing patients), we can adjust for prevalence by assuming a 3-year treatment duration or prevalence pool (conservative estimate):

- **Total Treatable Population (Prevalence)**:

- US: ~9,567 patients

- EU5: ~17,835 patients

- China: ~9,450 patients

- Japan: ~2,598 patients

- **Total**: ~39,450 patients

Step 2: Market Penetration (20% to 30% Share of Treated Patients)

The problem assumes a 20-30% share of treated patients. This accounts for:

- Competition (e.g., intravesical chemotherapy, pembrolizumab for BCG-unresponsive NMIBC with CIS, or cystectomy).

- Access, pricing, and reimbursement challenges.

- Physician and patient adoption.

We'll calculate for both ends of the range:

- **20% Penetration**:

- US: 9,567 * 0.2 = ~1,913 patients

- EU5: 17,835 * 0.2 = ~3,567 patients

- China: 9,450 * 0.2 = ~1,890 patients

- Japan: 2,598 * 0.2 = ~520 patients

- **Total**: ~7,890 patients

- **30% Penetration**:

- US: 9,567 * 0.3 = ~2,870 patients

- EU5: 17,835 * 0.3 = ~5,350 patients

- China: 9,450 * 0.3 = ~2,835 patients

- Japan: 2,598 * 0.3 = ~779 patients

- **Total**: ~11,834 patients

Step 3: Pricing Assumptions

Pricing for novel bladder cancer therapies (e.g., pembrolizumab, a checkpoint inhibitor for BCG-unresponsive NMIBC with CIS) can serve as a benchmark. Anktiva is an IL-15 superagonist immunotherapy, likely to be priced as a premium therapy.

- **US**: Pembrolizumab costs ~$10,000 per dose, with a treatment cost of ~$100,000-$150,000/year. We assume Anktiva at ~$120,000/year.

- **EU5**: Pricing is typically 50-70% of US prices due to reimbursement negotiations. Assume ~$70,000/year.

- **China**: Pricing is lower due to market access and affordability. Assume ~$40,000/year.

- **Japan**: Pricing aligns closer to EU levels. Assume ~$70,000/year.

Step 4: Potential Peak Sales Calculation

Peak sales are calculated as: (Number of treated patients) * (Annual treatment cost per patient).

At 20% Penetration:

- US: 1,913 patients * $120,000 = **$229.6 million**

- EU5: 3,567 patients * $70,000 = **$249.7 million**

- China: 1,890 patients * $40,000 = **$75.6 million**

- Japan: 520 patients * $70,000 = **$36.4 million**

- **Total Peak Sales (20%)**: **$591.3 million**

At 30% Penetration:

- US: 2,870 patients * $120,000 = **$344.4 million**

- EU5: 5,350 patients * $70,000 = **$374.5 million**

- China: 2,835 patients * $40,000 = **$113.4 million**

- Japan: 779 patients * $70,000 = **$54.5 million**

- **Total Peak Sales (30%)**: **$886.8 million**

Potential Peak Sales Range: **$591 million to $887 million annually** across US, EU5, China, and Japan.

Step 5: $ Value of 1% Share of Treated Patients

A 1% share of treated patients corresponds to 1% of the total treatable population (39,450 patients) = **395 patients**.

- US: (9,567 * 0.01) = 96 patients * $120,000 = **$11.5 million**

- EU5: (17,835 * 0.01) = 178 patients * $70,000 = **$12.5 million**

- China: (9,450 * 0.01) = 95 patients * $40,000 = **$3.8 million**

- Japan: (2,598 * 0.01) = 26 patients * $70,000 = **$1.8 million**

- **Total $ Value of 1% Share**: **$29.6 million**

Final Answer

1. **Potential Peak Sales for nogapendekin alfa inbakicept-pmln (Anktiva)** in BCG-unresponsive NMIBC with CIS (20-30% penetration):

- **Range**: **$591 million to $887 million annually** across US, EU5, China, and Japan.

- Breakdown:

- US: $229.6M to $344.4M

- EU5: $249.7M to $374.5M

- China: $75.6M to $113.4M

- Japan: $36.4M to $54.5M

2. **$ Value of 1% Share of Treated Patients**:

- **Total**: **$29.6 million**

- Breakdown:

- US: $11.5M

- EU5: $12.5M

- China: $3.8M

- Japan: $1.8M

Note: These estimates are based on assumptions regarding epidemiology, market penetration, and pricing. Real-world data on patient numbers, adoption rates, and actual pricing may vary. Adjustments can be made if more specific data (e.g., clinical trial results, payer coverage, or competitor dynamics) becomes available.