

# Biocompatibility / Safety Testing for Medical Devices

The table on the reverse side outlines the ISO/FDA test modalities frequently used to study the biological safety and biocompatibility of medical devices. These tests should be conducted on final product or representative samples according to the category of the device (based on anatomic location and duration of contact). WuXi AppTec's comprehensive menu of services includes all the tests related to the table's "Tests for Consideration," as well as those tests that may be required for Japanese (JMHLW) submissions.

For regulatory clearance purposes, most tests should be carried out under controlled laboratory conditions in compliance with Good Laboratory Practices (GLP).

## WuXi AppTec's biocompatibility / safety testing services feature:

- Dedicated isolated study suites
- Interpretation of histopathology and other toxicology data
- Regulatory consultation to optimize study for specific devices

WuXi AppTec is a global leader in providing discovery, testing and manufacturing services for the pharmaceutical, biologics and medical device industries. Research-driven and customer-focused, with operations in China and the U.S., WuXi AppTec offers a broad and integrated portfolio of services designed to assist our customers with cost-effective and efficient outsourcing solutions.

**WX  
LISTED  
NYSE**

## AVAILABLE TESTING SERVICES INCLUDE:

- **Cytotoxicity (in vitro)**  
Agarose Overlay (USP, ISO)  
MEM Elution (USP, ISO)  
Direct Contact  
Growth Inhibition  
Extract Colony Assay (JMHLW)
- **Sensitization (in vivo)**  
Guinea Pig Maximization  
Guinea Pig Repeated Patch (Buehler)  
Murine Local Lymph Node Assay (LLNA)  
Maximization Sensitization Test (JMHLW)
- **Irritation/Intracutaneous Reactivity (in vivo)**  
Intracutaneous (USP, ISO, JMHLW)  
Primary Skin Irritation (ISO, JMHLW)  
Ocular Irritation  
Intraocular Irritation  
Mucosal Irritation: Oral • Vaginal • Bladder  
Acute Dermal Limit
- **Systemic (Acute) Toxicity (in vivo)**  
Acute Systemic Toxicity (USP, ISO, JMHLW)  
Pyrogen-Materials Mediated (USP, ISO, JMHLW)  
Mouse Safety & Abnormal Toxicity
- **Subacute/Subchronic Toxicity (in vivo)**  
Subacute Toxicity  
Intravenous • Intraperitoneal  
Subchronic Toxicity (JMHLW)
- **Genotoxicity (in vitro and in vivo)**  
*In vitro* Bacterial Mutagenicity (Ames)  
*In vitro* Mouse Lymphoma  
*In vitro* Chromosomal Aberration  
*In vivo* Mouse Micronucleus  
Bacterial Reverse Mutation (JMHLW)  
*In vitro* Chromosome Aberration (JMHLW)
- **Implantation (in vivo)**  
Intramuscular Implant (USP, ISO, JMHLW)  
Subcutaneous Implant  
Intraperitoneal Implant
- **Hemocompatibility (in vitro and in vivo)**  
Hemolysis Test  
– Extract Method (ASTM or NIH)  
– Direct Contact Method (ASTM or NIH)  
– Hemolytic Toxicity (JMHLW)  
Complement Activation  
Coagulation Studies  
Platelet and Leukocyte Counts  
Intravascular Thrombogenicity
- **Chronic Toxicity**  
Subcutaneous • Intraperitoneal  
Dermal • Intravenous • Oral
- **Carcinogenicity**
- **Clinical Pathology**  
Chemistry – 18 Test Parameters  
Hematology – 14 Test Parameters
- **Histopathology / Immunochemistry**
- **Other Biocompatibility Testing**  
USP Rabbit Pyrogen Test  
LAL Bacterial Endotoxin Tests for Pyrogenicity  
USP Safety Test in Mice and Guinea Pigs  
*In vivo* Assay for Viral Contaminants  
Cytotoxicity Screening of Dissolvable Materials  
USP Class I-VI
- **Part 18 Risk Assessment and Analytical Chemistry**

**Customized assays, complete toxicology and custom implant studies also available.**

For more information on WuXi AppTec's services please contact:

**U.S.**  
+1 (651) 675-2000 • +1 (888) 794-0077  
info@wuxiapptec.com

WE ARE DETERMINED TO SERVE YOU BETTER®

[www.wuxiapptec.com](http://www.wuxiapptec.com)

# Biocompatibility / Safety Testing

## TESTS FOR CONSIDERATION

[Based on ISO 10993-1:2003(E) and FDA G95-1 Guidelines]

DEVICE CATEGORIES		BIOLOGICAL EFFECT										
		Initial								Other <sup>4</sup>		
Body Contact	Contact Duration	A – Limited [≤ 24 hrs]	Cytotoxicity	Sensitization	Irritation	Systemic Toxicity	Subacute (Subchronic) Toxicity	Genotoxicity	Implantation	Hemocompatibility	Chronic Toxicity	Carcinogenicity
		B – Prolonged [>24 hrs to ~30 days]										
		C – Permanent [>30 days]										
SURFACE DEVICES	Skin	A	●	●	●							
		B	●	●	●							
		C	●	●	●							
	Mucosal Membranes	A	●	●	●							
		B	●	●	●	◇	◇		◇			
		C	●	●	●	◇	●	●	◇		◇	
	Breached or Compromised Surfaces	A	●	●	●	◇						
		B	●	●	●	◇	◇		◇			
		C	●	●	●	◇	●	●	◇		◇	
EXTERNAL COMMUNICATING DEVICES	Blood Path, Indirect <sup>3</sup>	A	●	●	●	●				●		
		B	●	●	●	●	◇			●		
		C	●	●	◇	●	●	●	◇	●	●	●
	Tissue <sup>1</sup> /Bone/Dentin Communicating	A	●	●	●	◇						
		B	●	●	●	●	●	●	●			
		C	●	●	●	●	●	●	●		●	●
	Circulating Blood <sup>3</sup>	A	●	●	●	●		◇ <sup>2</sup>		●		
		B	●	●	●	●	●	●	●	●	●	
		C	●	●	●	●	●	●	●	●	●	●
IMPLANT DEVICES	Tissue / Bone	A	●	●	●	◇						
		B	●	●	●	●	●	●	●			
		C	●	●	●	●	●	●	●		●	●
	Blood <sup>3</sup>	A	●	●	●	●	●		●	●		
		B	●	●	●	●	●	●	●	●		
		C	●	●	●	●	●	●	●	●	●	●

807

<sup>1</sup> "Tissue" includes tissue fluids and subcutaneous spaces.

<sup>2</sup> For all devices used in extracorporeal circuits.

<sup>3</sup> Pyrogenicity / Materials Mediated should be considered.

<sup>4</sup> Supplemental tests for consideration.

● – ISO Evaluation Tests for Consideration

◇ – Additional tests that the FDA considers may be applicable

For reproductive and biodegradation tests, contact your WuXi AppTec Account Manager.