

# The *International Journal of Cancer* enforces strict quality control of the cell lines used in biomedical research<sup>★</sup>



Nicole Yvonne Souren<sup>1</sup>, Konstantina Falida<sup>2</sup>, Stefanie Heck<sup>2</sup>, Franca Bianchini<sup>2</sup>

<sup>1</sup>Department of Clinical Genetics, Maastricht Universitair Medisch Centrum, 6229 HX Maastricht, Netherlands

<sup>2</sup>*International Journal of Cancer (IJC)*, Im Neuenheimer Feld, 69120 Heidelberg, Germany

## Impact of misidentified cell lines

**Misidentified:** cell line that no longer corresponds to original donor and may come from an entirely different species, tissue or disease



**1955:** believed to originate from a laryngeal carcinoma

**1967:** geneticist **Stanley Gartler** unmasked both cell lines as HeLa

**2021:** Christopher Korch and Amanda Capes-Davis estimated:<sup>\*</sup>

**8497** articles may have used **HEp-2** inappropriately, producing an estimated 277,000 citations



**1957:** believed to originate from embryonic intestinal cells

**1397** articles may have used **INT 407** inappropriately, producing an estimated 45,000 citations

**\$990 MILLION**

estimated amount spent on articles published on HEp-2 & INT 407

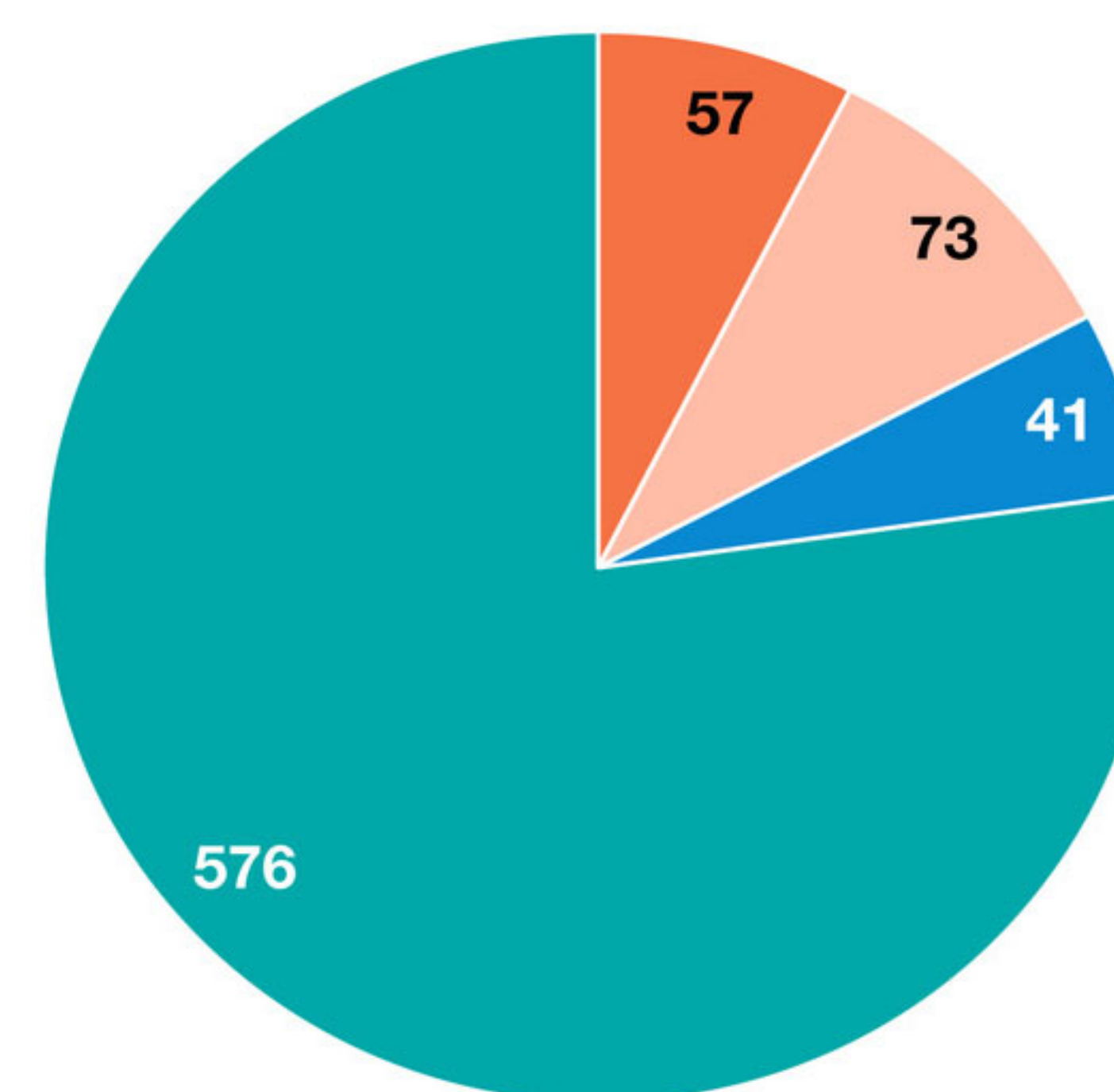
## Cell line authentication at *IJC*: requirements from authors

- **Cell line authentication reports** of all human cell lines used in the manuscript (not older than 3 years)
  - **DNA profiles:** i.e. **short tandem repeat (STR) profiles** with high quality electropherograms
  - **Purchase orders or invoices** from a certified cell bank or commercial provider
- All cell lines must be listed using the **official cell line name and its Research Resource Identifier (RRID)**
- A **statement** confirming that all human cell lines have been authenticated using STR within the last 3 years

## Cell line-related problems at *IJC*

- **July 2018 - June 2021:**
  - **747** manuscripts containing **4,138** human cell lines were selected for peer review
  - **216 (5.2%)** misidentified cell lines were identified
  - The most frequent contaminant was **HeLa (44.4%)**
  - The highest percentage of misidentified cell lines was observed among **gastric cancer (25.4%)**, followed by **liver cancer (16%)** cell lines

All manuscripts (n=747)



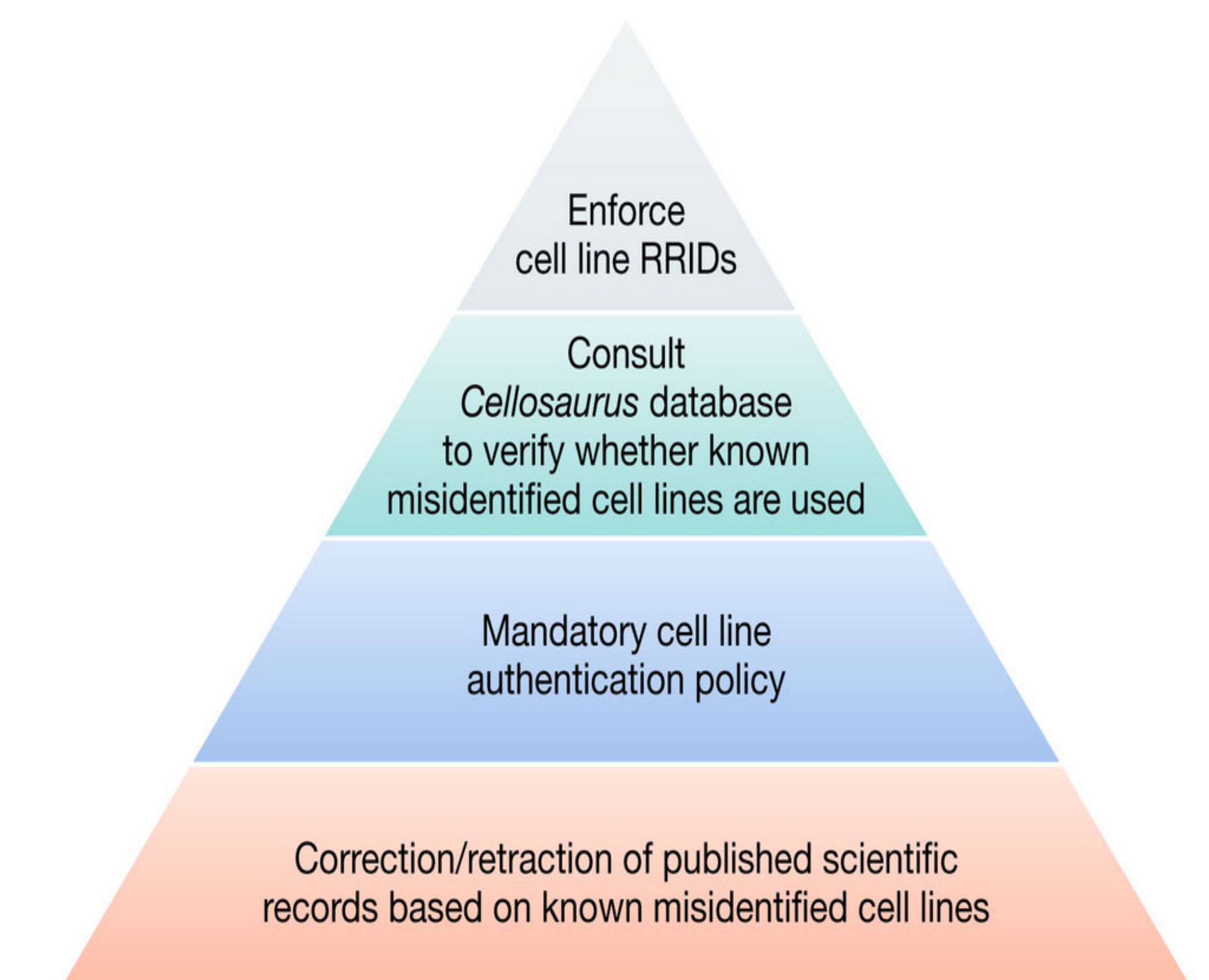
- **No problems**
- **Minor cell line problems:** e.g., minor textual adaptations
- **Moderate cell line problems:** e.g., 1 cell line had to be removed from the manuscript, because it was misidentified
- **Severe cell line problems:** e.g., at least 2 cell lines had to be removed from the manuscript, because they were misidentified
- ◆ In total, **35 (4.7%) manuscripts** were rejected for severe cell line-related problems

## Follow-up study

- **July 2018 - March 2023:**
  - Follow-up of **106** manuscripts rejected/unsubmitted for cell line-related problems
  - ↓
  - 78 (73.6%)** manuscripts published in other journals
  - ↓
  - 72 (67.9%)** manuscripts published in other journals, including the data of the misidentified cell lines

## Recommendations

Strict editorial quality control procedures are essential to prevent publishing data based on misidentified cell lines



**Cellosaurus:** Online knowledge database on cell lines used in biomedical research (<https://www.cellosaurus.org>)

