



SMA screening



LaCAR

LIFE AND CARE ADVANCED RESEARCH

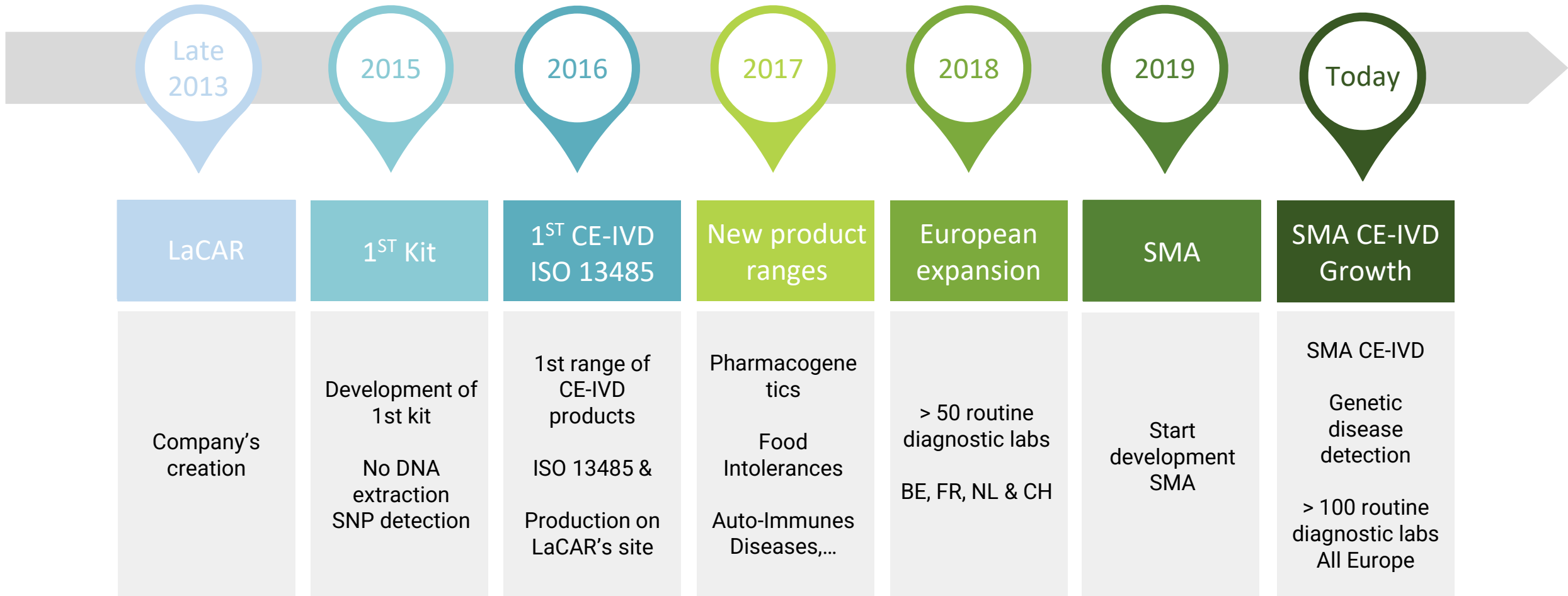
LaCAR

- ❖ Belgian company **created in 2013**
- ❖ **Goal:** to be the first company to offer an easy solution for genetic molecular diagnostics.

SNPs detection

NO
DNA extraction

LAMP technology



SMA studies

- ❖ Our objective is to promote **SMA screening of newborns**
- ❖ We are sponsoring a **pilot study in 10 sites**
- ❖ To carry out 200 000 tests to demonstrate the feasibility of routine use.



How does it work- theoretically?

Principle of LC-SMA-LP

- ❖ Screening for SMA
 - ❖ No DNA extraction
 - ❖ Directly from dry blood spot
 - ❖ Automated interpretation
-
- ❖ All necessary reagents are provided in the kit:
 - ❖ Lysis buffer
 - ❖ Reaction buffer
 - ❖ Control



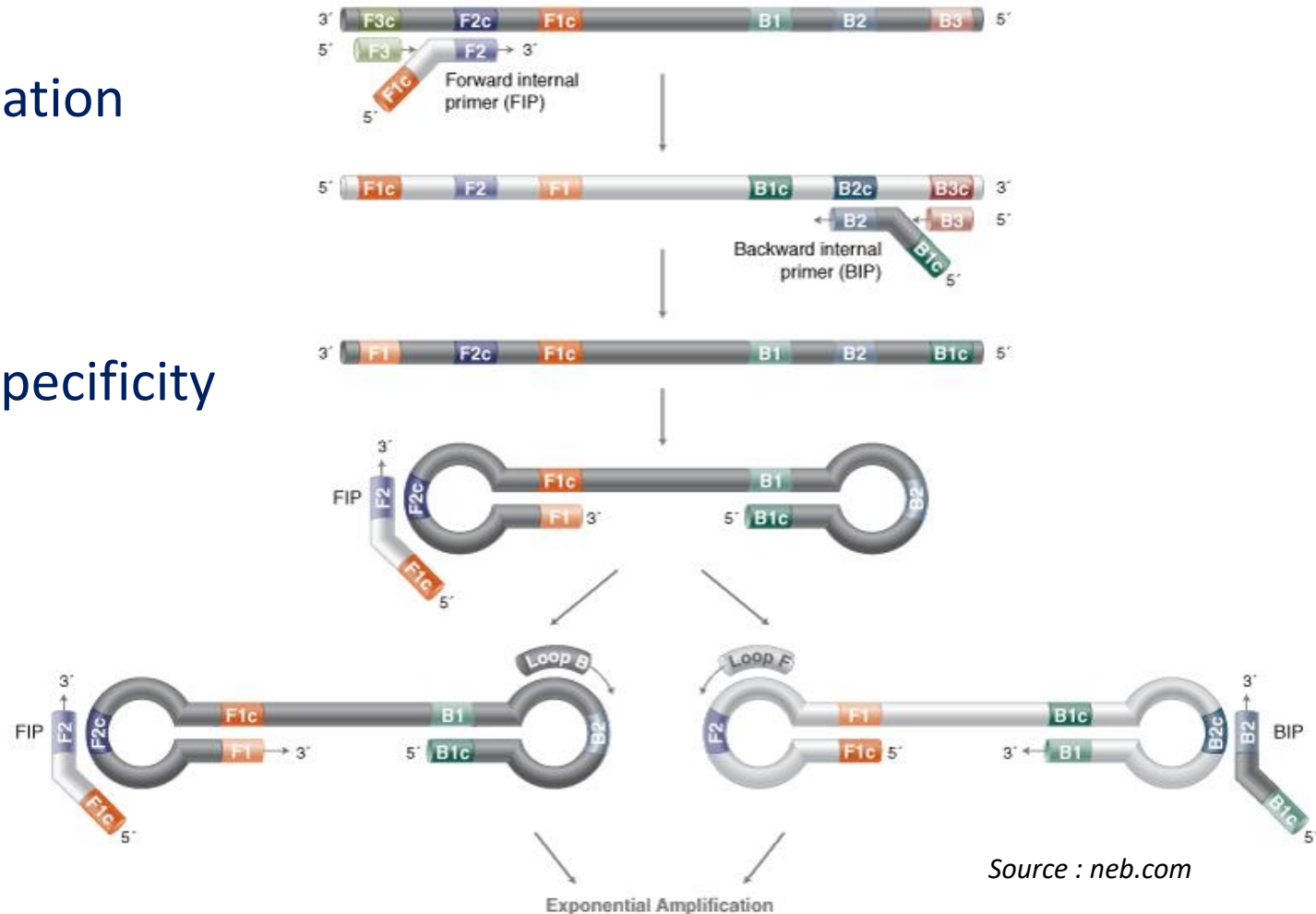
LAMP technology

Loop-Mediated Isothermal Amplification

- ✿ Simplicity
- ✿ Cost effective
- ✿ Ruggedness
- ✿ Rapidity

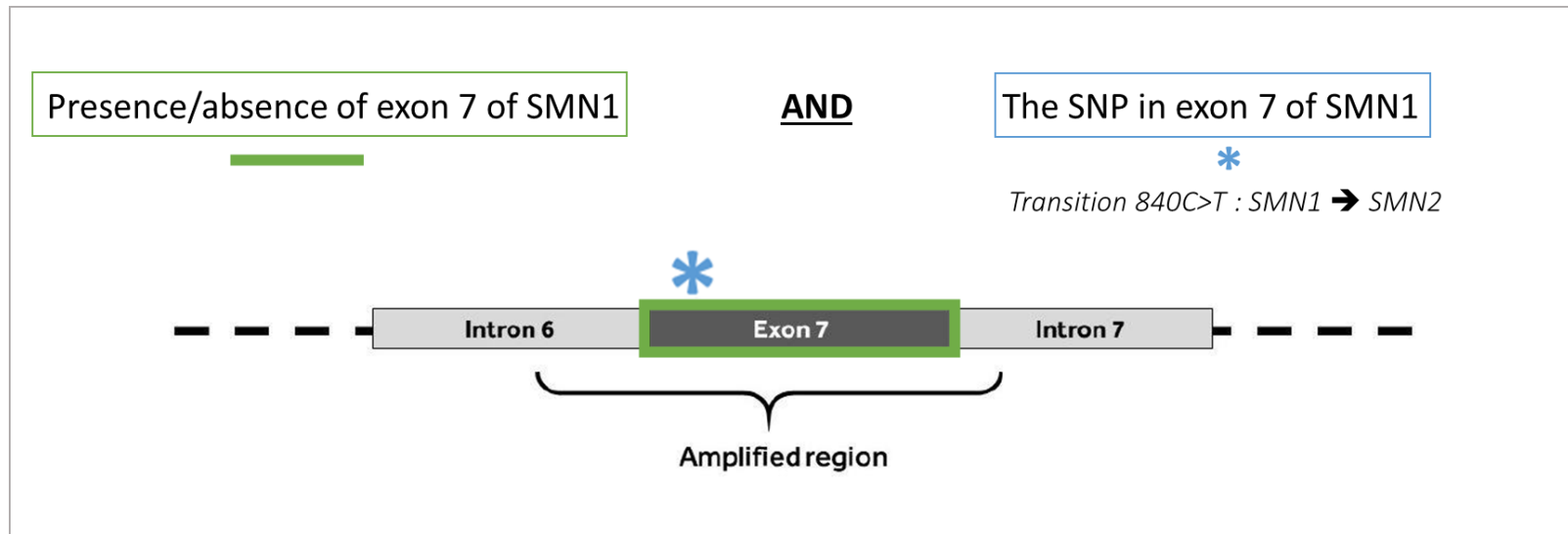
✿ 6 primers increasing the reaction's specificity

✿ High amount of DNA produced



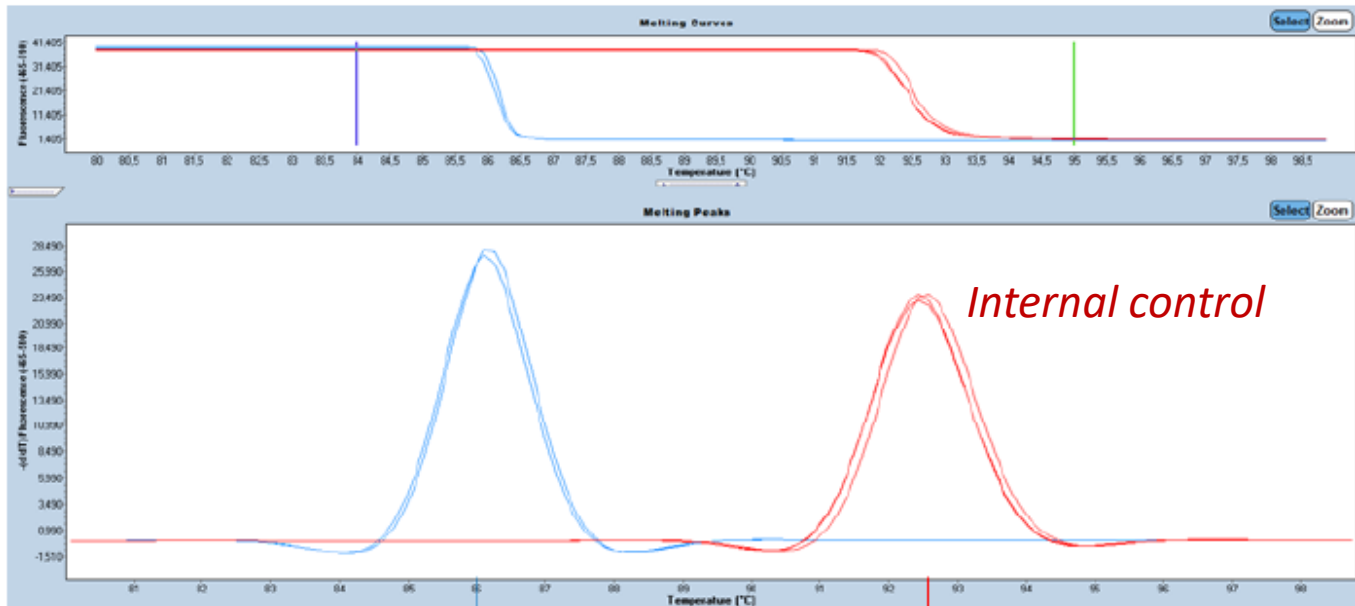
SMA

- ✦ Primers specifically amplifying *SMN1* Exon 7
- ✦ Primers specifically amplifying an internal control
- ✦ Sequence-specific probe for the c.840C>T SNP within exon 7



Amplicon Detection

Temperature



Exon 7 presence

Exon 7 absence

❖ Detection of **SMN1**

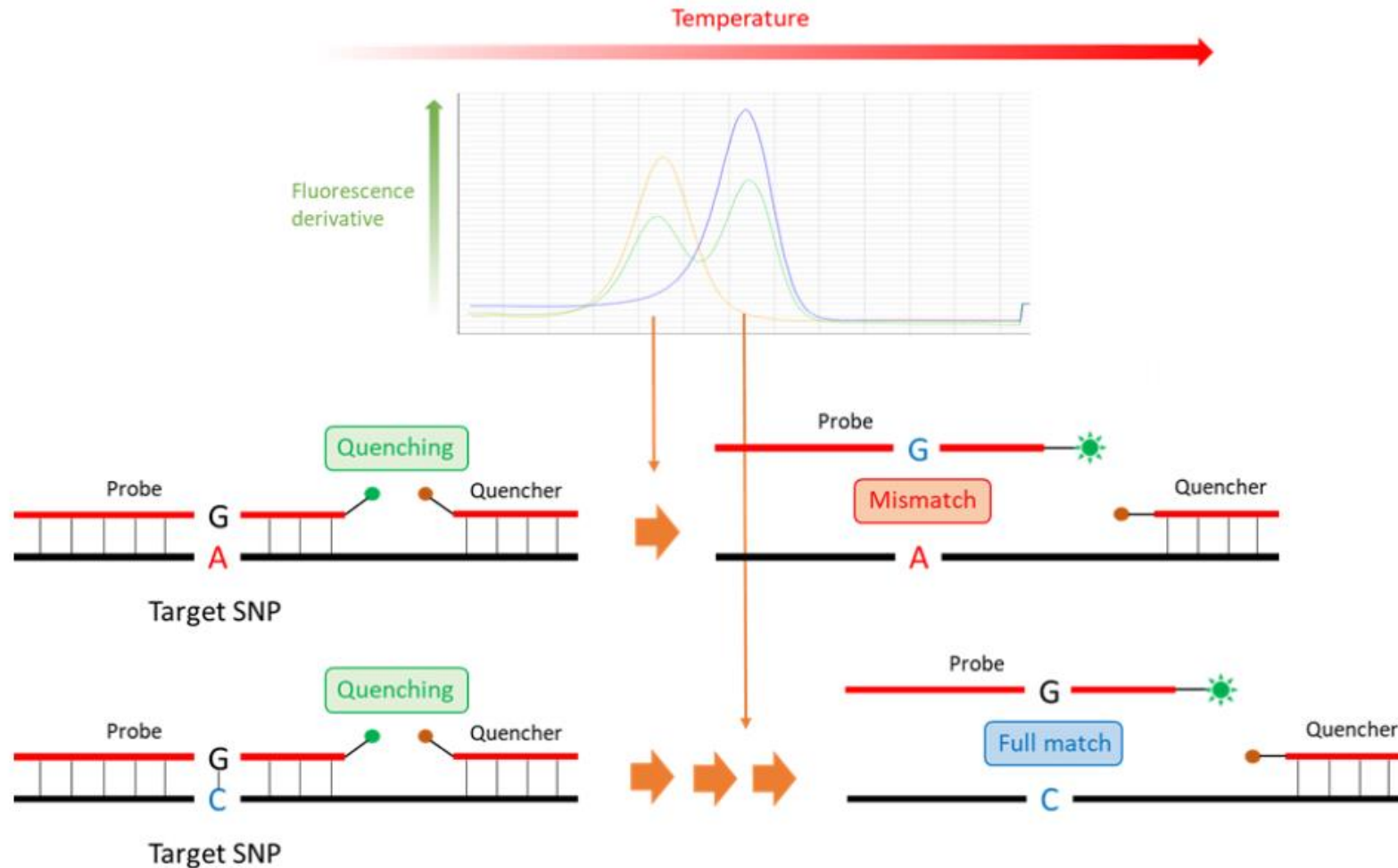
➔ SMN1 exon 7 is **present**

or

❖ Detection of **Internal control**

➔ SMN1 exon 7 is **absent**

SNP Detection



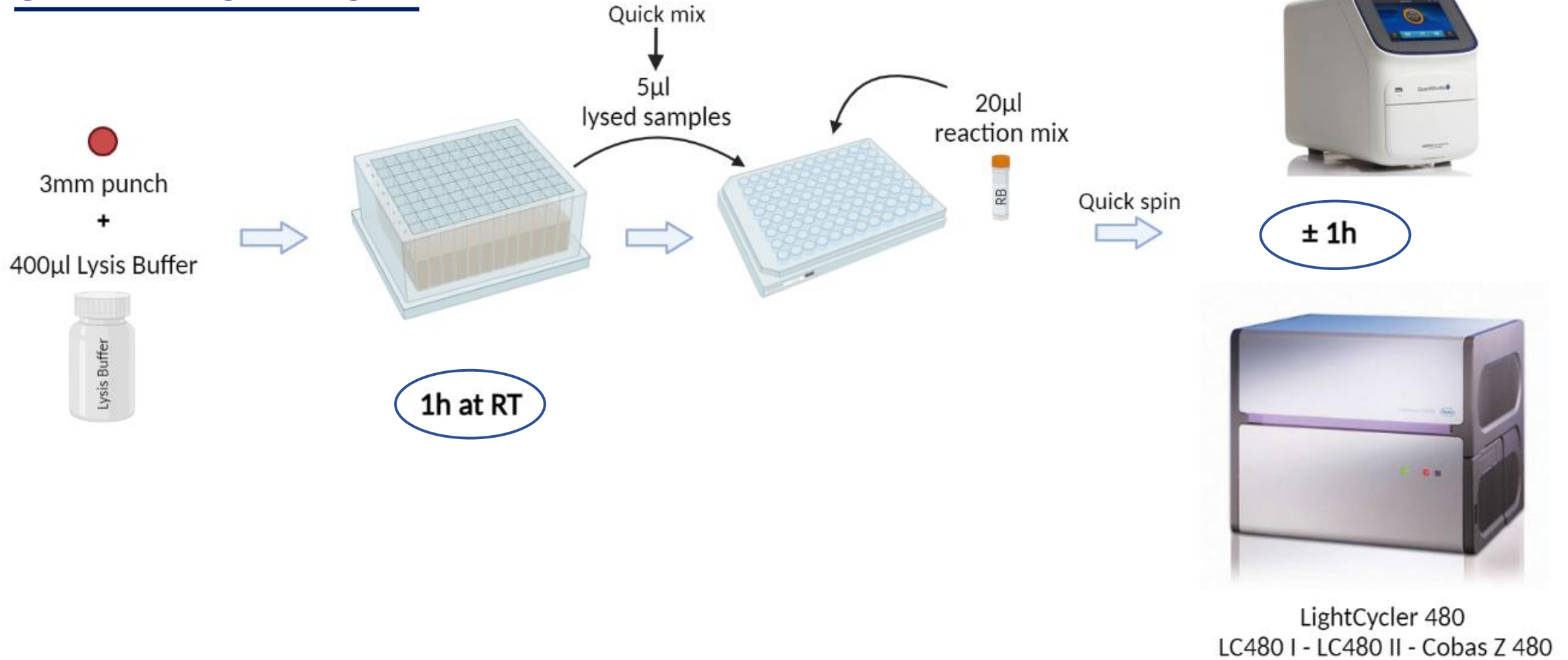
❖ Detection of **SNP** 840C >T
➔ SMA **positive**

❖ Detection of **Wild type** 840C >T
➔ SMA **negative**



How does in work- in practice?

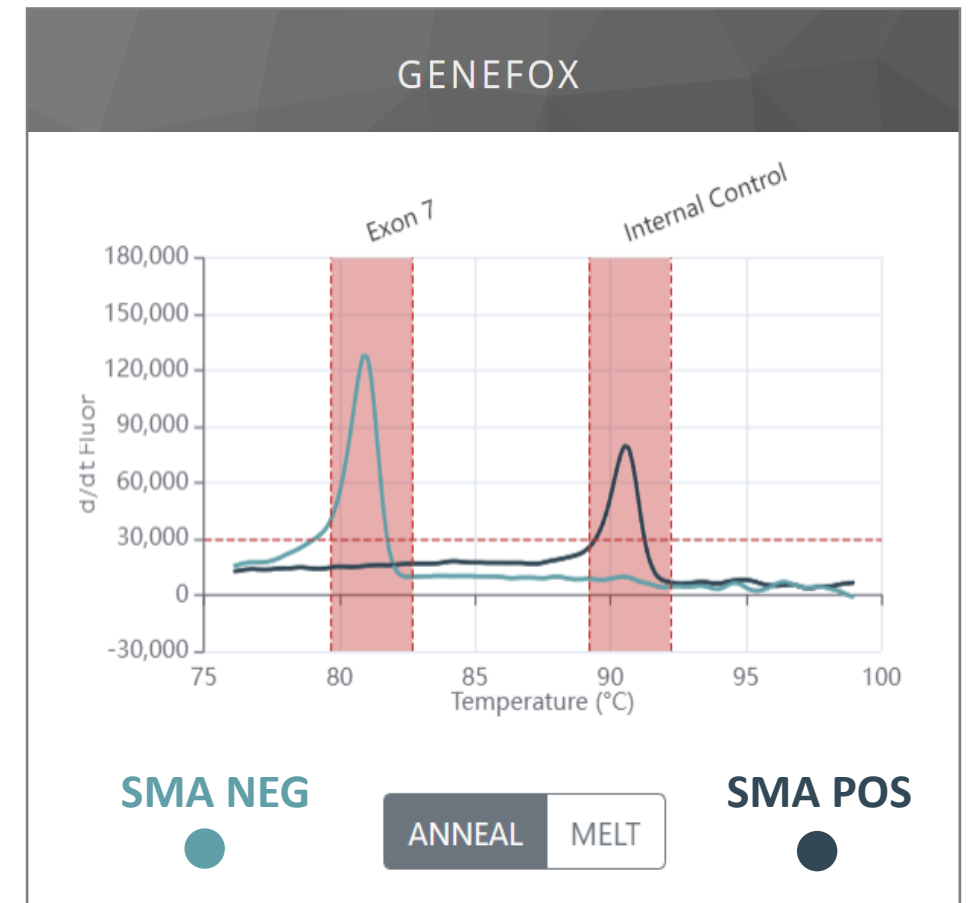
SMA Workflow



Automatic Interpretation

Genefox software

- ❖ Import raw data file
- ❖ Automated interpretation
 - ❖ Combines amplicon detection and SNP detection
 - ❖ Indication of valid/invalid
- ❖ Full traceability
- ❖ Export of report (pdf, csv)





Conclusion



- ❖ Exon 7 deletion and conversion (840C>T)
- ❖ No carrier detection

- ❖ Directly from dry blood spot
- ❖ No DNA extraction required
- ❖ Limited pipetting
 - ➔ Limited error/contamination risk

- ❖ Possible automation of workflow
- ❖ Automated interpretation => GeneFox



- ❖ Other mutations can be present
 - ➔ Like the other methods: 3-5% is not detected

- ❖ Risk of false positives
 - ➔ All positives are confirmed + SMN2 copy number

- ❖ SCID assay in development

 **CE-IVD marked assay for SMA**

 **International SMA study**

➔ **10 sites (Spain, Germany, Italy, ...)**

➔ **200 000 tests**

➔ **Newborn screening for SMA is feasible using the LaCAR method**





THANK YOU FOR YOUR ATTENTION!